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AUTOMOTIVE INDUSTRIES

Volume 55
Number 26

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, DECEMBER 23, 1926

35c a copy
$3.00 a year

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- CHUCKING MACHINE -

It is because of engineering superiority—and a record of unfailing performance—that New Britain Automatics are found in the plants of those who know production.

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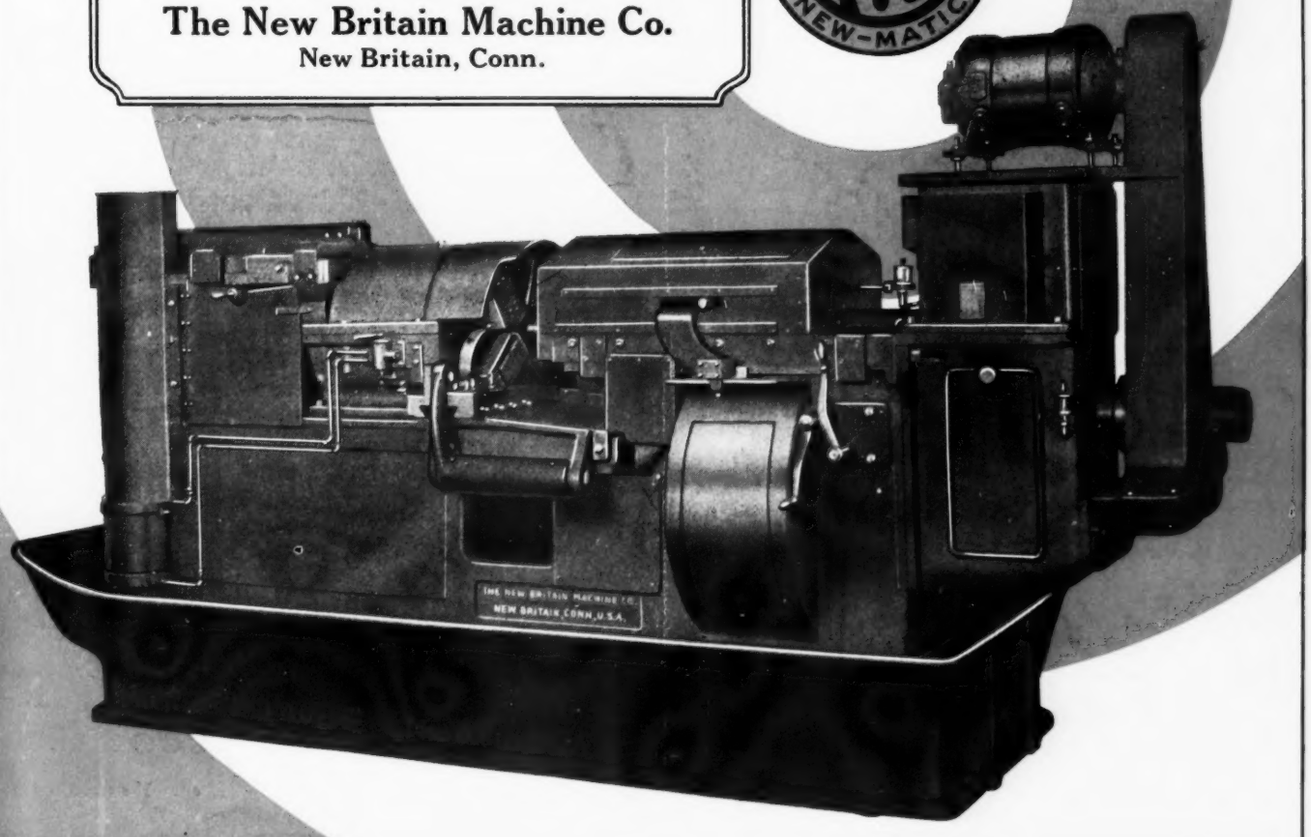
New Britain, Conn.



Entered as second-class matter Oct. 1, 1926, at the post office at Philadelphia, Pa., under the Act of March 3, 1879

One of a fleet of 25 Waukesha "Ricardo Head" engined Trucks

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Wild Water in an oil well may cause losses that run into a $100,000. It occurs at any time day or night. To block it off—oftentime a mile below ground—requires special pressure cementing machinery. For this service the Perkins Oil Well Cementing Co. of Los Angeles maintain a salvage corps of 25 Waukesha equipped Fageol Trucks. They were chosen because of their proven ability to get thru almost impassable oil field roads and their time tried reliability, under such conditions.

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AUTOMOTIVE EQUIPMENT DIVISION

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AUTOMOTIVE INDUSTRIES
VOLUME 55 *Philadelphia, Thursday, December 23, 1926* NUMBER 26

Automotive Steel Consumption Stabilized in 1926

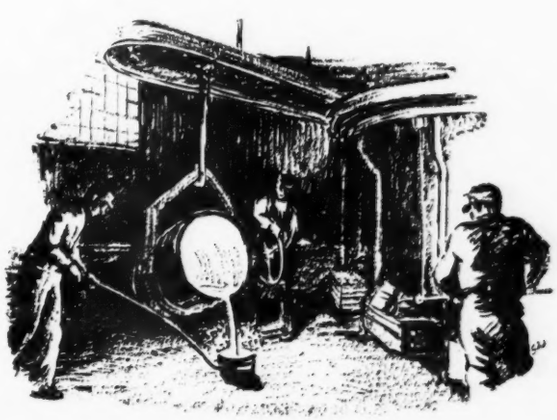
Industry now accorded definite ranking as third largest user of steel. Survey of metal markets indicates settled conditions will prevail in 1927.

By William Crawford Hirsch

FROM the automotive standpoint, one of the most interesting happenings in the iron, steel and nonferrous metal markets during 1926 was the change which came about in the status of the automotive industry as a consumer of steel.

Up to 1925, automotive consumption of steel was the unknown quantity, the variable in the computation of the whole. No matter whether it was a poor year or a good one for the railroads, the steel producer said that railroads were his best customers in point of tonnage. Building might be brisk or slow, but structural steel demand was considered the steel producer's second best bet. And then he usually took a long breath and said: "Last year the automotive industry was the third heaviest consumer of steel, but there is no telling what it will do this year."

This attitude was changed completely in 1926. The automotive industry's status as the third largest consumer of steel has become so stabilized that the producer takes it for granted. This has both its advantages and disadvantages. Obviously, the more firmly entrenched the status of a buyer is, the more commanding his position as a market factor. On the other hand, the stabilized status of the automotive industry as a steel consumer means to the producer that the orders from this source to a large extent will come to him with less effort than was the case while he was building up the demand from this industry. Therefore there is danger of stagnation in the development of higher quality products.



There is disappointingly little in the way of guidance to automotive consumers in the 1926 metal market statistical records. It was not so much a year of stability as one in which stabilization was sought by both producers and consumers, whenever the temporary trend favored the one or the other. There was no spectacular shifting in prices, such as had been a feature of the more hectic post-war years, except perhaps in tin, a metal of minor importance to the automotive industries.

Steel production was on an even keel, the total theoretical ingot output for the year being estimated in round figures at between 46,000,000 and 47,000,000 tons as against 44,000,000 tons in 1925. The movement of iron ore from the Lake Superior district during the 1926 navigation season aggregated 58,500,000 tons compared with 54,000,000 tons in the corresponding period of 1925, the movement being the largest since 1920.

While suffering in the Atlantic seaboard markets from foreign competition, merchant furnaces supplying automotive foundries with iron were able to maintain a fair rate of operations, the year's pig iron production being estimated to have exceeded that of 1925 by 8 per cent.

While the statistical indices for 1926 show a slight improvement in general steel consumption over that of 1925, and while profits of the large steel companies, as disclosed by their dividend declarations, were satisfactory, a case can be made out for either 1925

or 1926 as having been the better automotive steel year, the choice depending largely upon individual considerations.

Rivalry for Automotive Business

Fortunately, perhaps, for automotive steel consumers, 1926 developed intensive rivalry between sheet and strip mills for automotive business. While 1927 may bring little change in the total automotive steel consumption, a marked change may ensue as to the proportion that will go to sheet rollers and the share that strip mills will carry off. In fact, 1926 brought a good deal of change in this respect, and the steel-sheet industry will do well to bear in mind the aggressive competition of the strip manufacturers before making up its mind that it is going to have just so much automotive business, whether it cultivates the field more or less intensely.

Some advantage accrues to automotive steel buyers from the greater diversification of the semi-finished materials resulting from the increased use of strip steel. While the same influences that peg sheet-bar prices as a prop to the sheet market whenever it displays signs of weakness also dominate the market for the semi-finished material used by strip mills, competition between the two descriptions of semi-finished and finished steel imposes a certain restraint in periods of peak-demand.

At this writing, it is too early to say whether the sheet manufacturers derived any immediate advantage from the change in the gage-base which they promulgated last September. The black sheet base was changed from 28 to 24-gage, and full-finished automobile sheets from 22 to 20-gage. The gage differential on the latter was changed from .05 to .15. The great bulk of the automotive sheet consumption during the year's last quarter was covered before price advances, announced on the heels of the changed gage base, went into effect, and since then there has not been sufficient in the way of representative buying to test the market fully. The sheet manufacturers claim that their sole object in introducing the new gage base system was to bring prices in harmony with production costs, light gages having sold lower, and heavy gages higher, according to the rollers, than costs warranted. That price advances ensued so soon after change in the gage base might have been merely a coincident.

Sheets started the year in a market in which orders dwindled from day to day, black No. 28 gage holding at 3.25c until early February, when prices yielded $2 a ton. To this decline another $1 was added in June, followed in September by a modest recovery of $1. Following the change in the gage basis, a $2 per ton advance was announced in October, after consumers had been given every opportunity to cover their requirements for the last quarter at old prices.

The Sheet Market

The market for full-finished automobile sheets started the year at 4.40@4.50c for No. 22 gage. Gradually prices crumbled, and when the gage base was changed from 22 to 20, the former was quoted at 4.30c, to which, by reason of the changed differentials, $2 per ton was added, while no change ensued in the new 20-gage price at 4.25c.

The extremely narrow price movement in the year's sheet market emphasizes the almost perfect balance that was maintained between the power of buyers and sellers. The former were unable to depress prices very much, even during the dullest spells, while the latter could not raise them even when demand was at its best.

The steel bar market opened the year at 2c, Pittsburgh, receded to 1.90c in May, and recovered to the year's opening price before the end of that month. Since then the market has been on the same basis, nominally so at times, when some producers would shade prices to the extent of $1 or $2 a ton, and then again spasmodically very firm with small tonnages bringing a premium over the 2c level. At the year's close the market is none too firm at the 2c price. A Cleveland producer, after having completed two 18-in. mills, threw a monkey wrench into the market by offering steel bars at 2c, Cleveland, a few months ago, thus ushering in a new basing point in addition to Pittsburgh, which rather perturbed the mills in the latter territory.

Automotive consumption of cold-finished steel bars during the year was high. Cold-finishers complained steadily that the differential between the 2c price for hot-rolled bars and 2.40c for their cold-finished product was inadequate. They sought unsuccessfully to bring pressure for lower prices on the hot-bar mills and for higher prices on consumers, being caught between the upper and the nether millstone.

Strip Steel Conditions

The strip steel market was at times a very animated affair, with automotive plants the principal consumers. Keen competition was in evidence at all times and caused a wider disparity of prices than the very slight month-to-month fluctuations of quoted prices. For the major part of the year the base price of hot-rolled hovered around 2.50c, Pittsburgh, while the range for cold-rolled of late has been between 3.25 and 3.50c, as against a 3.90c average at the year's opening.

Steel plate tonnages found their way into automotive drawing and pressing operations. During the better part of the year the plate market was decidedly in buyers' favor, ranging from 1.80 to 1.90c, Pittsburgh, throughout the year.

Indirectly, the automotive industries consumed large quantities of steel in the form of machine tools. Constant pressure to institute still further short-cuts in production led to liberal machine tool purchases by automotive manufacturers. It has been nothing unusual in the last year or two for manufacturers to change cold-press finishing equipment over and over again, jumping from 250 to 500 and 600-ton presses, so as to obtain longer die life and greater accuracy.

Prices for automotive alloy steels were on an even keel throughout the year. No marked changes took place in the market for alloys, except in ferromanganese, the quotation for which has been $100 per ton of late, $10@$15 below the year's opening price. This resulted from English and German competition. Ferromanganese consumption in 1926 is believed to have exceeded 300,000 tons, as compared with 260,000 tons last year.

Ferro-vanadium ruled steady throughout the year at $3.25@$4.00 per lb., content basis, 30 to 40 per cent vanadium. Molybdenum held steady. Ferrochrome showed no change over 1926.

Chromium made great forward strides as a plating material in the automotive industries in 1926. A leading motor car manufacturer succeeded in getting the cost down to 50c per sq. ft., as compared with 46c for nickel. The latter metal, used both in steel alloys and as plating material by the automotive industries, ruled

at unchanged prices throughout 1926, the ingot at 35c and the electrolytic at 39c. Recently a new outlet for nickel and chromium was reported by a manufacturer of electric gray iron castings, who succeeded in introducing these alloys, either alone or in combination, into a charge of pig iron and steel scrap.

Pig Iron Prices

Automotive foundries had little trouble in covering their 1926 pig iron requirements at reasonable price levels. The market opened the year with No. 2 foundry, valley, at $20.50. Prices receded steadily until in August $17.50 was chalked up. Slight recovery followed, but recently a Buffalo merchant producer has invaded the territory of other blast furnace owners with prices $1 below theirs. The market, at the year's close, ruled quiet, and stood nominally at $19, valley. Quite a few automotive foundries carried over into the new year four quarter contract tonnages closed at $18.

From an automotive point of view, the outstanding development in the 1926 aluminum market was the more intensive manner in which the sole domestic producer sought to develop sales to automotive consumers. Following out its policy of selling its product in as highly a finished state as possible, this company is now marketing more and more of its aluminum in the shape of finished castings, and, as brought out at a recent Federal Trade Commission hearing, at prices at which it is impossible for most automotive plants to produce them in their own foundries. In line with this innovation is that of taking back scrap from automotive consumers at prices much higher than those obtainable in the open scrap market.

The aluminum market was stationary from Jan. 1 to Nov. 3, with the price for virgin ingots, 98 to 99 per cent pure, pegged at 27c. On the last mentioned date the domestic producer lowered the price of No. 12 alloy from 26½ to 25½c and that of aluminum-silicon alloys by 1@1½c per lb. These aluminum-silicon alloys, by the way, are coming in for more and more use, especially so in the aeronautical branch of the automotive industry, the No. 47, with a 12 to 13 per cent silicon content, coming in for special attention. It is expected that considerable of the output of the new Quebec plant of the domestic producer will be shipped to Detroit automotive plants.

European Combines Continue

Europe continues to send reports of a combine of the Continental aluminum producers, Norway being said to be the only country not in the cartel. The British producers appear to be standing aloof as well. European markets were on a much lower basis than ours during the entire year. Importers, however, appear to take their cue from the domestic producer's price rather than from market conditions in the countries from which their supply is shipped. Imports into the United States in 1926 are estimated at 65,000,000 lb., a record for all time. The production of the domestic producer is also believed to have left previous records in the shade. While automotive consumers are not deriving very much benefit in price from the competition of imported metal in the American market, the presence of a foreign supply is in itself looked upon as a reassuring factor. It is, however, the general impression that the world's aluminum markets are dominated far more by an understanding among producers than by their competition.

Undoubtedly, at the first sign of tariff revision efforts, aluminum will come in for much discussion, but not even importers seem to be aggressively enthusiastic on the subject and it is more than doubtful that the customs status of the metal will be changed.

The copper market of 1926 proved very disappointing to the producers of the red metal. On the first business day of the year, the quotation for electrolytic was 13⅞c, net refinery. During the first half of December the market ranged from 13⅜@13⅝c. The best that copper could do during the year was 14¼c, which high prevailed for a brief time in August. The copper producers devoted most of their attention to the perfecting of arrangements for an export combine, which finally came into being in November. It continues to meet with determined opposition in the London market. Copper and brass products sold at reasonable and sometimes at bargain prices throughout the year. Automotive consumers virtually duplicated in 1926 their 1925 purchases of automotive brasses, etc.

Tin, even in the limited quantities in which it is used in the automotive industries, chiefly in bronzes and bearing metals, gave consumers many an uneasy hour in 1926. Starting the year at 62¼c, Straits tin crossed the 70c line in October, and even at exorbitant prices was at times difficult to purchase for spot delivery. Since then the market has eased off slightly, but speculation in Singapore and London, together with an actual recession in production and visible supply compared with former years, continue to hold prices at unreasonably high levels. As a result tin is only being used when no other metal can be substituted.

Lead Market

Storage battery manufacturers fared in the lead market about the same during the first half of 1926 as they did during the corresponding period of 1925, but during the second half of 1926 prices were much more in consumers' favor than during the second half of 1925. Zinc started at what proved to be the year's top price, 8.45c, St. Louis. In May a price below 7c was reached, but recovery set in, and by the middle of December the market was fairly steady at 7c, East St. Louis.

A year devoid of spectacular happenings in the iron, steel, and non-ferrous metal markets, 1926 has been, for all that, what is commonly referred to as a "good steel year." Above everything else, it was a most useful year in that it was the bridge between the hectic after-the-war period and the more settled condition that is certain to set in.

Automotive consumers as well as steel producers have become accustomed to hand-to-mouth buying. It has become the rule, rather than the exception. Plants are well prepared by equipment and discipline of their man-power to meet the demand in this manner, even when at peak.

Whether this hand-to-mouth buying will continue after 1927, depends upon whether the steel mills will continue to add their equipment in preparation for the growth in demand. If they do not, at the first sign of neck-of-the-bottle conditions being reached, there will return greater anticipation of wants on the parts of consumers. In 1927, however, it is hardly likely that any change in this direction will be necessary. Price swings have been shortened, and at this time there does not seem to be in sight any cloud that would justify uneasiness on the part of the automotive consumer of metals.

Stutz Increases Size of Engine, Adds New Body Model

**Bore is now 3¼ in., giving output of 95 hp. at 3200 r.p.m.
Standard touring brougham offered on 148 in. chassis.
Weymann bodies will be exhibited at New York.**

WEYMANN bodies will appear at a national automobile show for the first time next month when they are shown on a number of the Stutz exhibits at New York. In addition to introducing this type of body in America, Stutz will display a number of changes in engine and chassis details.

Changes in the powerplant include an increase of bore from 3 3/16 to 3¼ in., which permits development of 95 hp. at 3200 r.p.m. All valve stem guides have been made ¾ in. longer than before while the valve stem pistons are 5/16 in. longer. These changes have been made in order to hold the valves more accurately in alignment and the new guides also shield the exhaust valve stems from the exhaust flame.

The size of the piston ring lands has been changed so that the compression is increased from 70 to 80 lb. per sq. in. The bushing on the end of the connecting rod is now fly-tooled in order to give longer life. The fan has been changed from a 16¼ in., four-blade type to a 19½ in., six-blade type, in order to improve cooling under severe operating conditions.

The engine is now fitted with a Ther-Mo-Cool device which is designed to raise the temperature of the water in the cooling system from 60 deg. to 160 deg. quickly and then maintain practically constant temperature in summer or winter. The Ther-Mo-Cool is calibrated to block all passage of water through the engine block until its temperature reaches 150 deg. Fahr. Then the valve begins to open and continues to open as temperature increases until it is fully open at 185 deg.

In the dual ignition system an eight-lobe cam has been substituted for the four-lobe cam formerly used in order to insure a better building up of the magnetic field of the coil and a more intense spark.

Changes Made in Axles

The type of rear axle which formerly was used only on the seven-passenger chassis is now standard on all models. It has larger wheel bearings, a new axle-shaft, a reinforced housing sleeve, an improved side gear and the bolted-on type of side case. The front axle now standard is heavier than its predecessor, having a heavier center, king pin and spindle, as well as larger wheel bearings.

Influenced by the greater speeds and acceleration made possible by the larger engine, six-ply tires have been substituted for the four-ply formerly used. A new muffler for the main exhaust pipe and a muffler for the intake heater exhaust pipe have been adopted for the purpose of subduing "drumming" and other exhaust noises and also to prevent back pressure in the main exhaust pipe.

Timken hydrostatic brakes are continued, but with some minor changes intended to improve their operation and life. Three-leaf, laminated springs—miniature carriage springs, in effect—have been substituted for the single leaf springs formerly used in the brake shoes. Anchor pins for the springs are now formed with a head at one end and have a cotter pin hole drilled at the other end and they are now fastened in the channel independent of any other means of engagement.

The brake fluid chambers have been reinforced by additional fabric. This fabric has also been rubber-coated on the outside to prevent moisture absorption. The passageway from the fluid chambers has been slightly altered in shape in order to facilitate bleeding of the brakes. The flexible hose from the brakes to the frame has been reinforced by winding it with free stretched fabric.

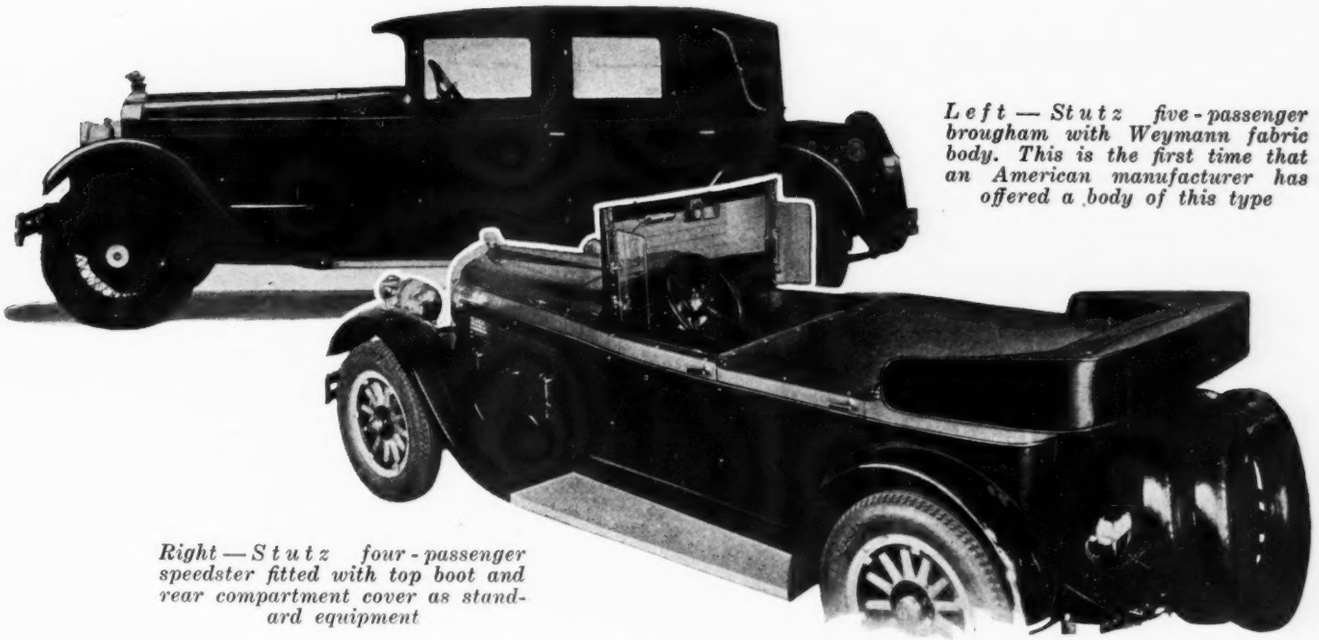
New Brake Lining Used

A new lining, prepared by Slade Products, Inc., is now used. It is a lock-stitch weave lining and is flameproof. The fabric is very dense, which gives it a low wear factor.

A brake supply-tank has been added as standard equipment. It is located on the right side of the engine and is for the purpose of adding fluid to the brake system to insure quick adjustment. A small air pump is permanently connected to the top of the tank, and manipulation of the pump plunger builds up air pressure on top of the fluid in the tank, thus forcing the fluid into the system when adjustments are necessary.

The starter pedal has been relocated directly over the brake pedal, and it has been designed to operate with very low pedal pressure. A molded battery case replaces the old type of wooden container. The positions of the clock and speedometer have been reversed on the new instrument panel, the speedometer now being on the right, so that it can be more easily read at night by the driver. The backing light is now so hooked up that it lights automatically when the brake pedal is depressed or the gear change lever shifted into the reverse position.

A new body model, a standard touring brougham, has been added to the Stutz line and is mounted on the 148 in. chassis. It is fitted with a large, hand-made trunk. In this body, as well as in all Stutz bodies, anti-squeak material is placed at all joints in order to prevent squeaking.



Left — Stutz five-passenger brougham with Weymann fabric body. This is the first time that an American manufacturer has offered a body of this type

Right — Stutz four-passenger speedster fitted with top boot and rear compartment cover as standard equipment

The use of Weymann bodies is said to so speed up production that a custom design of any type or style may be selected and the body completely finished within a week. These bodies are built as a series of parallelograms which are joined by cross pieces at the top and bottom.

No mortise and tenon joints are used, and no two pieces of wood come together, T or L-irons being employed to make joints and to leave a small air space between the ends of the wood members. Seats are mounted directly on the frame so that the entire body structure is permitted to weave quite freely when the car is operating over rough roads. The body is so flexible that even the windshield is hung on a universal pivot in the center so that it can move around to accommodate body movements. The door locks are practically universal joints and the hinges are on tapers so that they can move with comparative freedom.

The main feature of Weymann bodies is their lightness—it being possible to save up to 500 lb. by this method of construction over the conventional composite type.

Standard equipment on all models includes Watson Stabilators and two-bar bumpers in front and two-bar bumperettes in rear. Tires are 32 x 6.20 on the 131 in. wheelbase models and 32 x 6.75 on the 145 in. models.

Below is the complete line of standard, de luxe and custom-built Stutz cars for 1927, together with prices. Increases ranging from $155 to $200 have been made in the standard line. Wheelbase is 131 in. unless otherwise designated.

Standard

Model	Price
2-pass. speedster	$3150
4-pass. speedster	3160
Victoria coupe	3175
2-pass. coupe	3165
5-pass. sedan	3195
5-pass. brougham	3195
7-pass. sedan (145 in. wheelbase)	3685
7-pass. sedan limousine (145 in. wheelbase)	3785
5-pass. touring brougham (145 in. wheelbase)	3685

De Luxe

5-pass. sedan	$3320
5-pass. brougham	3320
7-pass. sedan (145 in. wheelbase)	3835
7-pass. sedan limousine (145 in. wheelbase)	3910
Touring brougham (145 in. wheelbase)	3835
Victoria coupe	3275
2-pass. coupe	3265

Custom

5-pass. sedan	$3995
Victoria coupe	3925
2-pass. coupe	3915
Cabriolet coupe	4170

New Zeppelin Design

A PATENT has been assigned to the Goodyear-Zeppelin Corp. by Eugene Schoettel, an employee, covering a new dirigible design which follows multiple gas container type construction, but brings important improvements in the number and spacing of the bags, it is claimed. Instead of a series of large bags running the length of the ship, the Schoettel design specifies stationary containers surrounded by smaller bags. The smaller bags permit better spacing, and the utilization of all available space.

Immediate construction of a ship of 6,000,000 cu. ft. displacement can be started if there is favorable action on the proposed Congressional appropriation for aircraft, it is announced. Although the new Zeppelin would be three times the size of the Shenandoah, it would be only 100 ft. longer.

Other features of the design are a double cover, one for the retention of lifting gas, the other a weatherproof and fireproof outer covering, having between them the stress-taking metal framework; interior of ship accessible for repairs even in flight; a double or triple keel, giving longitudinal strength; ring girders so designed that failure of part of the hull would not endanger the whole ship.

The big liner would be driven at 90 miles an hour by 4800 hp. motors, and could fly 5000 to 8000 miles with a full load without refueling.

New Six Truck and Bus Engine Designed by Lycoming

Series T furnished in three sizes for commercial vehicles. Is of L-head type with compression ratio of 4.4. Suitable for trucks up to 3½-ton rating and buses of medium size.

By P. M. Heldt

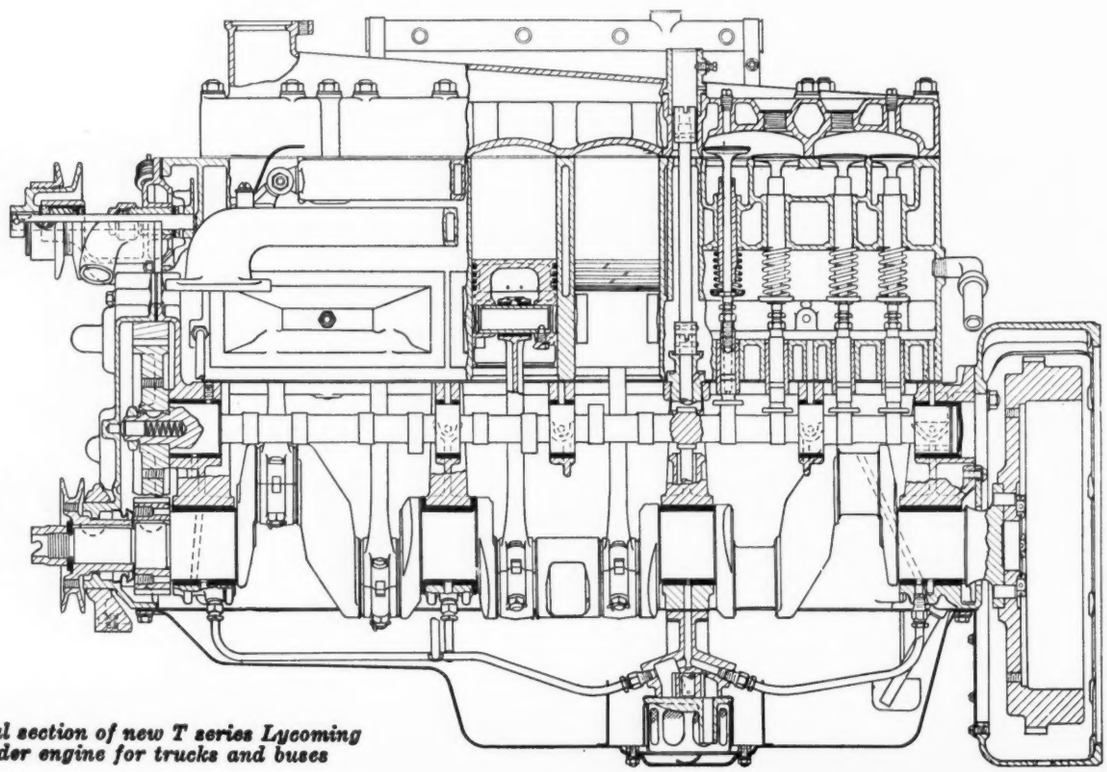
A SIX-CYLINDER engine specially designed for commercial vehicles, including both buses and trucks, is being offered to manufacturers by the Lycoming Manufacturing Co., Williamsport, Pa., in its new T series.

This series is made in three sizes, all with the same stroke of 5 in., the three bores being 3½, 3⅝ and 3⅞ in. With the smallest of the three bores the engine—known as the TH—has a displacement of 288.6 cu. in. and develops 60.5 hp. at 2700 r.p.m. The Model TF, with a bore of 3⅝ in., has a displacement of 309.6 cu. in. and develops 71 hp. at 2600 r.p.m., while the Model TS, of 3⅞ in. bore, has a displacement of 353.8 cu. in. and carries a peak load of 75 hp. at 2600 r.p.m.

The six cylinders are cast in a block, but the crankcase is a separate iron casting and the sump a steel pressing. A compression ratio of 4.4 is used. The cylinders are of the L-head type, the valves being arranged vertically on the left side. Inlet valves, which are made of chrome-nickel steel, are of 1 13/16 in. clear diameter, while the exhaust valves, made of Silcrome steel, are of 1 11/16 in. clear diameter. Both sets of valves have a lift of 5/16 in.

Cast-iron pistons are used, with four rings at the upper end, of which the lowest one is a Perfect Circle oil-control ring. The piston pin is locked in the piston bosses and has a bearing in a bronze bushing in the upper end of the connecting rod. It is 1⅛ in. in diameter and has a bearing length of 1 7/16 in. The piston is exceptionally long (4⅜ in.) and the axis of the pin is located substantially at the middle of the length of the effective bearing surface.

The connecting rods measure 10¾ in. from center to center and weigh 44 oz., with cap, bushing and



Longitudinal section of new T series Lycoming six-cylinder engine for trucks and buses

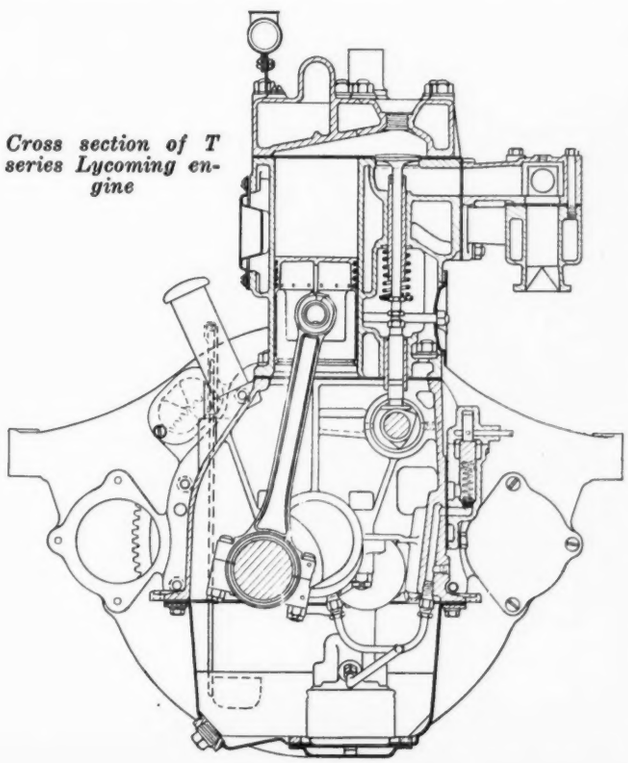
the centrifugally cast lining in the lower end.

The crankshaft is of the four-bearing type and takes end thrust on the first intermediate bearing. The crankpins are 2½ in. in diameter by 1⅝ in. long. All main bearings are of 2¾ in. diameter, the front and rear bearings being 2¾ in. long each, and the two intermediate bearings, 2¼ in. each.

Camshaft drive is by helical gears, from the crankshaft pinion to an idler gear and from the latter to the camshaft gear and to a gear on the accessories driveshaft. The idler gear can be made either of metal or of non-metallic material, in accordance with the desires of the customer. These gears have a face width of 1½ in. The camshaft is supported in five bearings of the following dimensions (front to rear): 2 1/32 by 2⅛, 2.006 by 1, 1 63/64 by 1, 1 31/32 by 1, and 1 61/64 by 1½ in. Camshaft end thrust is taken on the front bearing and a thrust plunger for reverse thrust is also provided. The cover over the gear-case is of cast iron.

The oil pan is of pressed steel and is provided with two cross baffles in the deeper, rear portion. It has an oil capacity of 6 qt. The bell housing is cast in one piece and is secured to the crankcase by means of two ½ in. dowels and seven studs. Provision is made for mounting the starting motor on either side, on the level of the crankshaft, the opening not used being closed by a sheet steel cover plate. On the right side there is another opening, somewhat higher up, over which is bolted a timing pointer which is used in connection with timing marks on the flywheel rim. The pointer proper projects inwardly from an annular disk stamped out to fit over the finished flange surrounding the opening, being threaded over the two flange bolts. A solid, stamped cover plate on top of the pointer stamping ordinarily covers the opening.

Manifolds of the Swan type, with square cross sections, are used. The inlet manifold runners are above the exhaust manifold, and the riser of the inlet manifold extends through the exhaust manifold and is thus exhaust-jacketed. Each end cylinder has a separate exhaust port, while the rest of the exhaust ports are siamesed. All inlet valves are siamesed, hence there are three ports. The exhaust is discharged from the manifold at the forward end, the flange for the connection of the exhaust pipe being horizontal.



Cross section of T series Lycoming engine

The drive for the oil pump and ignition distributor is taken off the camshaft opposite the second intermediary crankshaft bearing, and the distributor therefore is located 4 15/16 in. back of the center of the engine. This makes it possible to bolt the oil pump to the cap of the second intermediary main bearing. The spark plug bosses are located over the inlet valves.

Fan and water pump have a common shaft and are driven by V-belt. The shaft of the combined unit is supported in a Hyatt roller bearing at the fan end, and in a long bronze bushing at the pump end, this latter bearing being combined with the packing gland for the pump. The pump discharges into a passage cored in the front end of the block, which in turn discharges into a pressed steel water manifold on the water jacket cover plate. Drive of the combined unit is by a ¾ in., 28 deg. V-belt, adjustment of belt tension being effected by means of an adjustable flange on the pulley. The water outlet on the cylinder head is provided with a flange and counter-bored for a thermostat.

In order to insure that the water will circulate most intensively around the exhaust valves (where the greatest cooling effect is required), the water passages from the cylinder block to the cylinder head, which are distributed over the whole area of the joint, are made largest at the outside of the valve pockets. The holes in the water distributor are graduated, so as to insure that the jackets of the rear cylinders will get their proper share of the circulating water.

Pressure lubrication is used for all main and crankpin bearings, as well as for the front bearing of the camshaft and the idler gear bearing. The idler gear stud has a drilled passage in it which registers intermittently with radial holes in the idler gear, so located that oil is delivered to the teeth just before they contact with the teeth of mating gears. From the front camshaft bearing a by-pass carries oil to a trough located over the tappet guides, and holes are drilled through the bottom of this trough to the remaining four camshaft bearings. These bearings are also oiled from additional pockets cast in the webs supporting the camshaft bearings, which catch some of the oil splashed around in the crankcase. From these troughs the oil flows to the camshaft bearings through horizontal drill holes. The camshaft bearings are bronze-bushed.

An oil pressure regulator is provided, and is secured to the side of the crankcase, as shown in the cross section of the engine. It is in the form of a ball-type pressure relief valve, the pressure required on the ball to open the valve being varied by means of a plunger and an eccentric connected to the throttle valve. When the engine is idling the pressure on the oil ranges between 5 and 10 lb. p. sq. in., whereas under full throttle conditions the pressure reaches 40 to 50 lb. p. sq. in., the change from the lower to the higher pressure being gradual, of course.

The manifold from the pump to the caps of the main bearings is connected by Dole fittings. The pump is surrounded by a vertical type oil strainer with shroud, and a cover plate is provided in the pan underneath the pump through which the strainer can be removed for cleaning. The crankcase drain plug is at the right side, screwing into a fitting at the

lower edge of the sump, where it is more accessible than it would be in the cover plate under the pump. A float-type of oil gage is provided, the stem of the float extending up through a lug cast on the crankcase into a fitting which acts as both a guard and a scale. The oil filler and breather is located on the same side of the engine.

Three and four-point support are optional with the customer.

The weight of this engine without carburetor, ignition unit and fan is about 745 lb., there being only a few pounds difference in the weights of the different models. The maximum torque is developed at a relatively low speed and the torque remains substantially constant over a considerable speed range. This maximum torque is 190 lb.-ft. in the case of a 3⅝ in. bore and 210 lb.-ft. in the case of a 3⅞ in. bore.

Frictional Losses in Gear Wheels Determined by New Method

A NEW method for determining the frictional losses in gear wheels is described by K. Kutzbach in the *Zeitschrift des Vereines Deutscher Ingenieure*. It is based on the so-called closed-circuit principle, as distinguished from the "straight-through" principle, which has been used mostly in the past in determining the efficiency of spur gear trains.

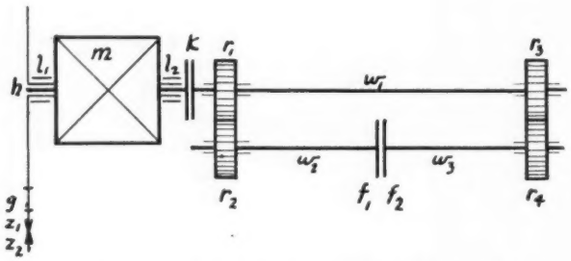


Fig. 1. Diagram of Kutzbach method of determining friction losses in gear wheels

The arrangement used by Kutzbach in some experimental work done for the Zahnradfabrik Friedrichshafen, an automobile transmission plant, is illustrated diagrammatically in Fig. 1. The method is a development of one first proposed by Rickli in 1911 (V. D. I. Vol. 55, p. 1435). Two similar pairs of gears r_1, r_2 and r_3, r_4 are used, of which r_1, r_3 are mounted on the same shaft w_1, which is driven through coupling k from the 3 hp. electric motor m. This motor is arranged like an electric dynamometer by being mounted in bearings l_1, l_2 so that its driving torque can be measured. A sliding weight g is carried on arm h, and z_1 and z_2 are pointers, z_2 being fixed. When the pointers are in line the motor is in equilibrium and the position of the sliding weight g then indicates the torque developed by the motor.

Gears r_2 and r_4 are mounted on shafts w_2 and w_3 which are connected by the adjustable coupling f_1, f_2. The tooth pressure corresponding to a certain gear load is obtained by securing a carefully balanced lever arm to one member of the coupling, say f_2, and hanging weights on its free end so as to produce a certain known torque on shaft w_3. While the shaft w_3 is thus under torsion the two members of the coupling are bolted together, and the flexibility of the shaft maintains the tooth load thereafter.

The tooth pressure then corresponds to the torque M_2 created by the load applied to coupling member f_2 while the electric motor supplies the torque M_1 lost in the circuit. The loss in the motor bearings and windage losses due to the coupling k are determined by running the motor light without gear wheels on the shafts and adjusting the sliding weight on shaft h until the two pointers are in line. The losses in the bearings supporting the gear shafts are separately determined and the remainder, after these losses have been substracted from M_1, represents the loss in the gears themselves.

All experiments made by the author were made on gears of the same pitch diameter (3.19 in.) the same width of face (0.4 in.) and with the same number of teeth (27). The depth of the teeth was varied in the different sets of gears and the pressure on the teeth was varied in steps to produce a maximum of 4470 lb. p. sq. in. of tooth section on the pitch circle. Loads of this intensity occur only in automobile gears and can be sustained continuously only with the best tool steel and at low pitch line velocities.

Theoretically it would be expected that the horsepower loss due to tooth friction would be proportional to the friction coefficient Mu and to the relative velocity v of slip between teeth. The velocity of slip increases with the depth of tooth, other things being equal. Experiments showed this relation to hold in practice. In order to reduce the frictional losses, the teeth should be rounded off or else shortened (stub teeth). For resistance to wear, on the other hand, teeth of full or even greater depth are desirable.

The results of the tests led Mr. Kutzbach to the conclusion that the friction coefficient has a value varying between 0.03 and 0.04. It was also found that in use a change in tooth profile occurs which in general reduces the frictional losses. For instance, if new gears are run together with a large initial tooth pressure and the tooth pressure is then gradually reduced and subsequently increased again, it is found that for a given value of the tooth pressure the value M_1/M_2, which is a measure of the specific frictional losses, is less the second than the first time this pressure is reached.

On the other hand, if the gears are run together for a sufficiently long time so that their true profile is destroyed by wear, then the loss for a given tooth pressure increases again. This is illustrated in Fig. 2, which represents the change in the ratio M_1/M_2 for a pair of gears of relatively soft material, an aluminum-lithium alloy.

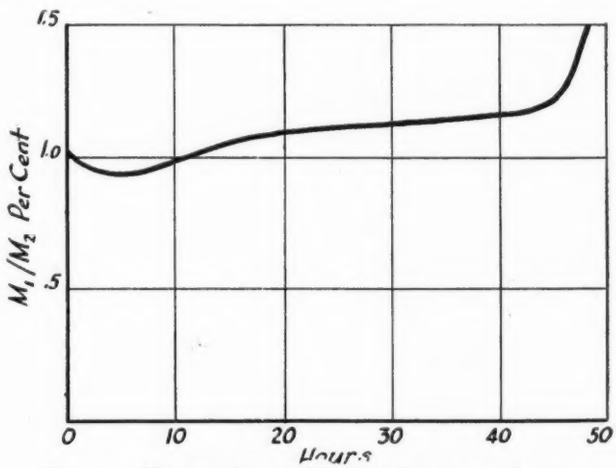


Fig. 2. Change in specific friction loss of gears with time

Just Among Ourselves

That's What Makes 'Em Wild—Sometimes

THE following piece of copy destined for a news story came to our desk the other day with a pencil notation, "Good news for you": "New York, Dec. 15.—The slow moving motorist who bears to the left is responsible for much traffic congestion and special attention will be given to him in the new traffic regulations to become effective here January 1, according to the traffic board of the local police department." The chap that made that pencil notation was familiar enough with our personal prejudices to know that this note would cause us at least one good grunt of satisfaction. Gradually the slow-moving road hog is beginning to get well-merited attention from police and traffic regulation bodies. The reckless speed merchant is a menace to automotive progress, literally and figuratively, to be sure, but the 15 m.p.h. doddler perhaps can be held responsible to some extent at least for the otherwise cautious drivers whom his poking goads to recklessness in an attempt to get clear.

* * *

Woman Can Sell Cars as Well as Buy Them

THE woman, long identified as potent in settling motor car purchases, seems also destined for a leading role in the sale of automobiles. Hardly a month goes by any more that the name and address of another successful woman dealer doesn't come to our attention. Just as women's knees are no longer news, successful women automobile and accessory dealers rapidly are becoming a normal instead of an unusual phase of the automotive business picture. Don't know of anybody who has conducted a survey yet to find out whether these women dealers find most of their vict—, that is to say, prospects among those of their own or the opposite sex.

* * *

New Rays May Solve Headlight Problem

SINCE the discovery of Hertzian waves and X-rays astounded the world in the nineties of the past century, several other kinds of rays have been discovered, most remarkable among which undoubtedly are the radiations of radium.

However, not all of the rays which have been announced since that time have actually materialized, or, perhaps it would be better to say, not all the claims of discovery have been substantiated. With marvelous discoveries on the one hand and apparent deception on the other, one is somewhat at a loss as to what to think when hearing of still further discoveries in this line, but, of course, any announcement that has a serious ring to it merits thoughtful consideration. The latest rays discovered, according to advices from London, make objects visible to the human eye in complete darkness. The rays are of a frequency and wave length that place them outside the visible spectrum, according to the report. Evidently a source of radiation is required, as well as a converter which changes the frequency of the radiation, just before it falls upon the eye of the observer, without changing its intensity at any particular point. Also, the objects one wants to observe must have at least a moderate degree of reflecting power. As in the case of other recent announcements in this line, the most obvious field of application of these rays would be in war, but the fog and mist piercing characteristics claimed for the new rays might find some future application to civilian airplane practice or even to automobile practice.

Do Inventors Get a Fair Shake?

DO inventors get a fair shake from the automotive industry? The inventors probably think not, but most automobile plants seem to us to be reasonably open to new ideas. It is perfectly true, of course, that quantity production does not lend itself to the rapid and frequent incorporation of radically new designs. For that reason the utilization of some ideas is delayed materially, sometimes perhaps side-tracked indefinitely. It is common to criticise automobile plants on that basis, the complaint being that the public is entitled to the use of improvements just as soon as they are known. On the other hand, it must be remembered that the public also is entitled to low-cost transportation, which it could not get without quantity production and the limitations which go with it—and low-cost individual transportation is the more essential of the two items after all.

* * *

How General Motors Handles New Ideas

A GOOD many plants spend a vast amount of time investigating systematically all of the new ideas which are available. General Motors, for example, has a New Devices Committee, upon which sit no less important executives than C. F. Kettering, H. M. Crane, J. H. Hunt and others, to consider all suggestions and inventions submitted to the corporation. Every suggestion, according to "Facts About a Famous Family," is first reviewed by a sub-committee, including representatives of the production divisions. It is also studied by individual experts of the corporation. Then it is forwarded with their recommendations to the New Devices Committee for final action.—N. G. S.

Rickenbacker Producing New Eight, Previous Models *Redesigned*

Line now consists of two eight-cylinder cars and a six. New eight engine has 3-in. bore. Two carburetors used.

By Leslie S. Gillette

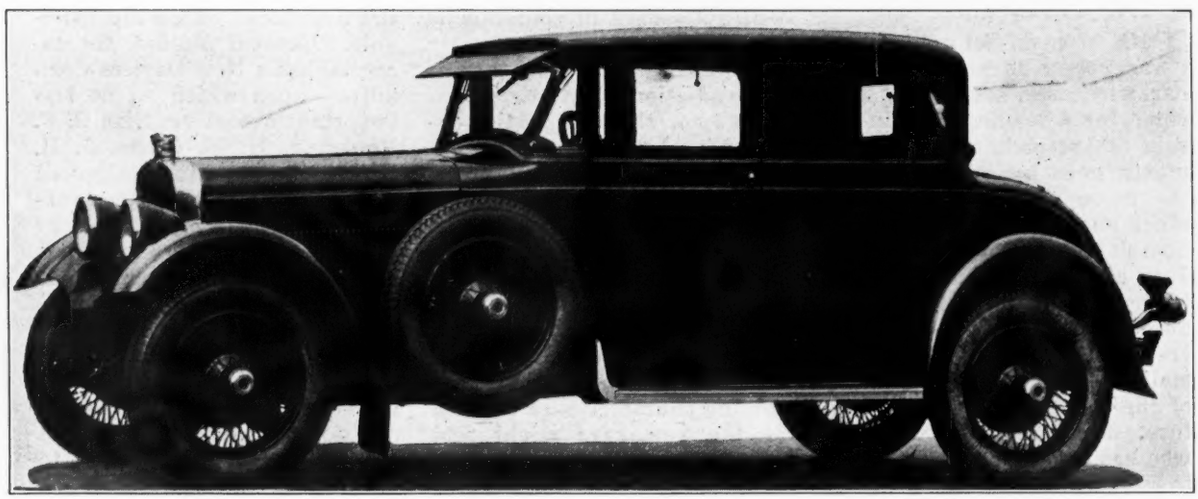
THREE lines of cars, two eights and a six, ranging in price from $1595 to $2795, are provided for in the production schedule of the Rickenbacker Motor Car Co. for 1927. While embodying several new features, the three chassis are of the same general design as the previous series. The bodies, however, are entirely new—lower and of more pleasing appearance.

Operating under a temporary and friendly receivership, the lately reorganized company is now in production on the new models. During the month of December between 300 and 400 of the new cars will be shipped and plans call for the production of 500 a month for 1927. According to Rickenbacker officials their dealer organization has remained intact during the reorganization period, and all dealers are now in possession of the new line of cars. The company expects to settle its $500,000 indebtedness and terminate its receivership within six months.

An eight-cylinder chassis has been added to the line for 1927. This new model, however, is an adaptation of the latest six-cylinder chassis to accommodate a light eight-in-line engine of 3-in. bore. Except for minor changes the new six is similar to the corresponding 1926 model. The third chassis is a modification of the previous eight-in-line model with a longer wheelbase and embodying several features of the "super-sports" car introduced at the national automobile shows in 1926. A sedan and a brougham-victoria, both five-passenger design, will make up the body line for both the 6-70 and 8-80 cars. The sedan and victoria bodies mounted on the "six" chassis are very similar to those on the smaller eight, except that the six bodies have straight roof lines whereas those on the 8-80 have a curved roof effect. On the larger eight, four special body styles are provided. The models, prices and chassis designations for the three cars are as follows:

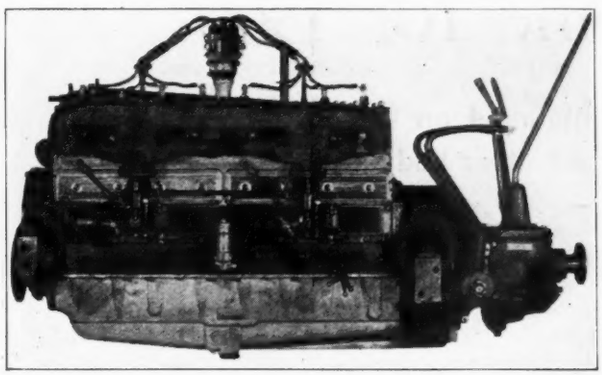
6-70	
Sedan	$1595
Brougham-Victoria	1645
8-80	
Sedan	$1795
Brougham-Victoria	1845
8-90	
Five-Passenger Sedan	$2595
Seven-Passenger Sedan	2695
Brougham-Victoria	2595
Seven-Passenger Berline	2795

Either body type on the 8-80 may be had with the spare tires mounted on both sides of the car, wheel



Rickenbacker 8-90 five-passenger brougham-victoria, listing at $2595. All bodies on this chassis, which is the larger of the two eights, have short running-boards and bicycle type front fenders

type front fenders and short running boards, or with the usual form of running boards with the spare tires carried at the rear of the body. On the 6-70 chassis the conventional system of mounting the tires at the rear and the full length running boards are standard. All 8-90 cars are regularly equipped with spare tire mountings on either side of the body, short running boards, wheel type fenders and vertical radiator shutters. The fenders on all models are of the full crowned type.



Both of the Rickenbacker eight-cylinder models are equipped with two carburetors and two air cleaners. This shows the 8-80 powerplant which has a bore and stroke of 3 by 4¾ in.

Radiators of the new series are of a new type and slightly higher. The fluting around the rim of the shell has been eliminated, and the shell now has a smooth surface. Upholstery in all models is in broadcloth, while walnut panels match the walnut steering wheel. Drum headlights are used on the six, bullet-shaped headlights are standard on both eights.

Except for powerplants, wheelbases and several minor details, the 6-70 and 8-80 chassis are alike and comprise the same major units. The eight-in-line engine employed in the 8-80 model has a bore and stroke of 3 by 4¾ in. This engine is similar in design to the 6-70 unit, except that two Zenith carburetors are employed. The wheelbase of the light-eight model is 119½ in., 1 in. longer than that of the 6-70 chassis. Compared with the previous six-cylinder model, the wheelbase of the new 6-70 chassis is 1½ in. longer. Balloon tires of 32 by 6 in. are used on both of these chassis. The new features which have been introduced on the 6-70 chassis, as compared with the "E" six-cylinder model which it replaces, are found also on the 8-80. Both of these models having the same wheelbase and the six-cylinder engine being shorter than the eight, the extra space on the six is utilized to fit a shroud over the radiator fan.

All brake drums have been increased in diameter from 12 to 14 in., the throw of the brake-actuating cams has been increased, and the brake linkage has been so altered as to apply 8 per cent more brake effort to the front than to the rear brakes, whereas formerly 7 per cent more was applied to the rear than to the front brakes. These changes are said to have improved the effectiveness of the four-wheel braking system to a marked degree. The hand lever now operates the rear wheel service brakes independently through a slip link on the rear brake cross shaft, while formerly it served to apply a brake to a drum back of the transmission.

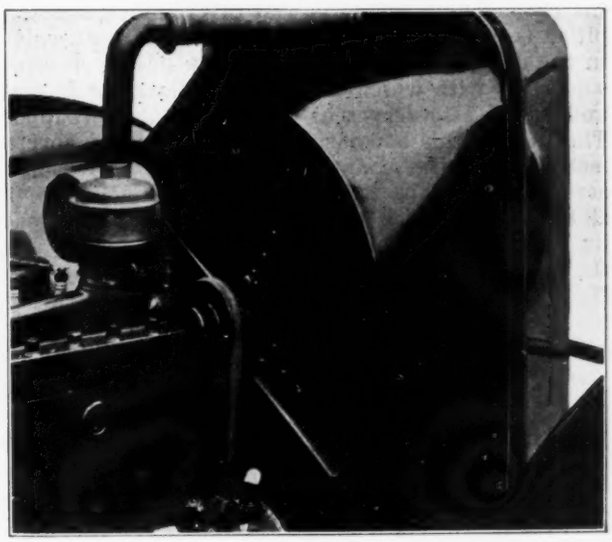
By the adoption of new mounting brackets, which support the powerplant in a lower position on the frame, the center of gravity has been lowered by about 1½ in. on all models. Wheels of 1 in. less diameter, a chassis frame of new design and improved roof lines combine to decrease the overall height of the cars by about 2½ in. Spring center distances have been increased 13/16 in. for the front and 3 in. for the rear springs, and all springs now extend parallel with the chassis axis. Hexdee spring control devices, two on each front spring and one on each rear, are used on both the 6-70 and the 8-80 chassis. The rear tread of all models has been increased to 58 in.

Changes in the six and the eight-cylinder engine include the following: Thicknesses of crankshaft cheeks have been increased 10 per cent; pushrod guide clusters are now formed in pairs instead of in sets of six, and a change has been made in the pushrod guide design which permits of easier inspection, adjustment or replacement. On the 8-90 engine the pushrod guides are made of steel forgings. The 6-70 and 8-80 engines have a Bishop & Babcock thermostat inserted in the water outlet from the cylinder head, while on the 8-90 series a thermostat embodied in the radiator operates the vertical radiator shutters which are standard on this model. Gascolator fuel filters are standard on all models.

A feature of both eight-cylinder engines is the employment of two carburetors, each fitted with an air cleaner. Each carburetor supplies four cylinders, and an equalizer tube is placed between the separate intake manifolds to equalize the pressures in them. Both intake manifolds are cast integral with the one exhaust manifold and the design is such that a hot-spot is formed for heating the intake mixture.

Other chassis changes on the three cars include the adoption of Hannum steering gears of the screw and nut type, which replace the worm and sector units employed on the previous series; the provision of an extra frame cross member behind the transmission, and an increase in the thickness of the frame stock from ⅛ to 5/32 in.

Standard equipment on all models, in addition to the more usual items, includes an electric dash gasoline gage, water thermostat, coincidental steering and ignition lock, automatic windshield cleaner and rear view mirror.

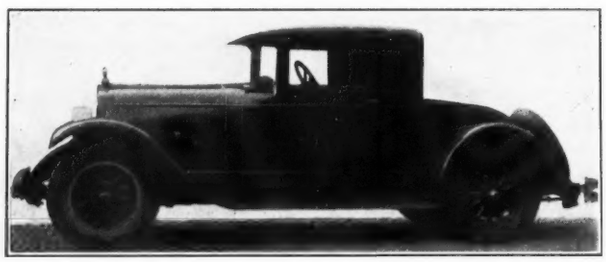


As the chassis of the 6-70 and the 8-80 are identical, the mounting of the six-cylinder engine places the fan a considerable distance from the radiator. To take care of this situation, a radiator shroud is used, as shown above

New Convertible Sedan is Feature of duPont Line for 1927

Five-passenger, four-door body, mounted on standard 125 in. chassis, lists at $3750. Four other body styles.

By Donald Blanchard



The new coupe model in the duPont line for 1927

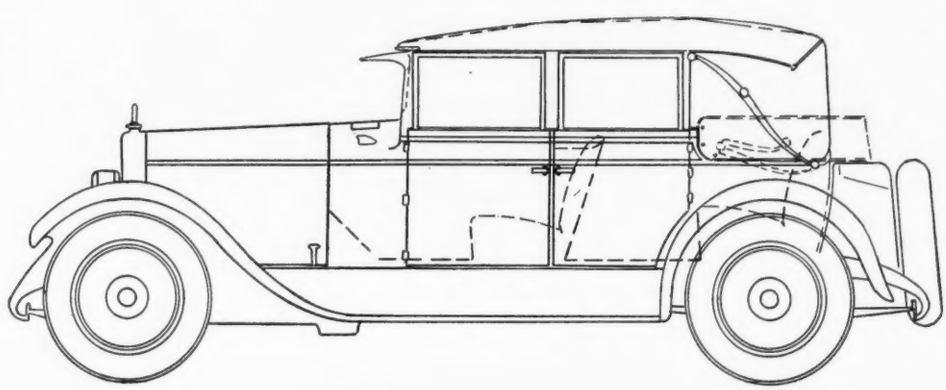
A FIVE-PASSENGER, four-door, convertible sedan priced at $3750 is the outstanding feature of the duPont line for 1927. This body is mounted on the standard 125 in. wheelbase chassis with six-cylinder, 3⅜ x 5 in. engine, as are the roadster, touring, coupe and sedan models which complete the line. The last four body styles mentioned have undergone detailed refinement so that the complete line presents a materially enhanced appearance.

In designing a four-door convertible body, one of the problems presented is that of providing a central pillar between the two doors. This has been solved in the duPont design by means of a light, reinforced wood bow with which the central pillars are integral and which also serves as an additional top support. The ends of this bow member have a tapered dovetail mounting in the body and are secured by thumbscrews. Removal is easy and provision is made for its storage in the top when folded. This is accomplished by proper proportioning of the folding top bows so that the necessary space is provided when the top is down.

The windshield is provided with a sun visor and its mounting follows customary closed car design. Its pillars are recessed to provide tracks for the forward edges of the front door windows. The rear edges of these windows as well as the forward edges of the rear door windows slide in similar recesses in the central pillar while the rear edges of the rear windows move in recesses in the hinged-mounted pillars at the front of the rear quarters. The door windows all have metal framings which are finished in nickel plating.

It will be noted from the accompanying drawing that the top edge of the rear body panel is dropped below the level of the top of the door. This feature adds materially to the appearance of the car when the top is down, as the folded top fits neatly into the space thus provided. As shown by the dotted lines, the seat back is carried up above the top of the rear body panel. A boot is furnished for the top. The trunk at the rear is covered with the same Burbank material used in the top.

Standard color on this model is Norse gray with red chassis and striping, and the upholstery is gray leather. However, as on all duPont models, a wide range of color and upholstery options is offered at no additional cost. Six wire wheels are included in the equipment on the convertible sedan and these also are finished in red. The two spares are carried on either side of the car just aft of the front fenders, the supports being brackets mounted on the frame side rails and extending through the splashers. Accessory equipment furnished is unusually complete and includes the same items regularly furnished on other duPont models.



Side elevation of duPont convertible sedan, showing top raised and body inclosed

Die-Rolled Axle Leaves Steel Mill Ready for Machining

Process developed by Witherow Steel Co. of Pittsburgh does away with forging and heat-treating operations at plant of purchaser. Other automotive products made by same method.

By Walter L. Carver

IN the Production Issue of Sept. 30, 1926, *Automotive Industries* published a brief article concerning the die rolling process by which a variety of forging blanks as well as live rear axle blanks are finished by the Witherow Steel Co. of Pittsburgh, Pa. Since that time, this company has completed the development of a new type of front axle which combines unusual physical properties with the general elimination of all forging and heat-treating operations at the plant of the purchaser. Instead of a semi-finished blank requiring further forging as in the case of earlier production, the new development is a completely fabricated axle ready for the machine line.

Fig. 1. Rolled front axle, incorporating rolled spring pads which are arc welded in place. Machining is reduced, dimensions are held very closely and structural characteristics are improved

Like all Witherow products, the new type axle starts as a 4 in. square billet and passes through a process of gradual heating and working to a straightening or hot bed in the form of long bars comprising several blanks. After partial cooling, these bars are cut to more easily handled lengths and then are annealed. Annealing is optional, depending upon the character of the part. Next, blanks are sheared away from connecting sprues and then are trimmed and the traces of flash are ground off. This process as related to the production of live axle shafts will be described in a later portion of this article.

At the conclusion of these operations the axle blank is in the form of a straight bar having the finished I-section. The ends are unfinished slugs of sufficient volume for the later production of finished ends. No spring pads are included but both flanges of the I-section are in some cases slightly wider in the region where spring pads in the usual forged axle are located.

The entire axle then is heated and the ends are finished singly in a forging machine. The single boss type of axle end is preferred, as its production problems are simpler than those of the yoke end. However, with the wide adoption of four-wheel brakes, the single boss end is used in the majority of installations. The rolled blank is normalized by the next heat which precedes the bulldozing operation.

From the forging machine, the blank is passed immediately to a bulldozer where the ends of the axle are offset to produce the customary drop. This operation also stretches the axle to the correct length as regards the center distance between king pins. In

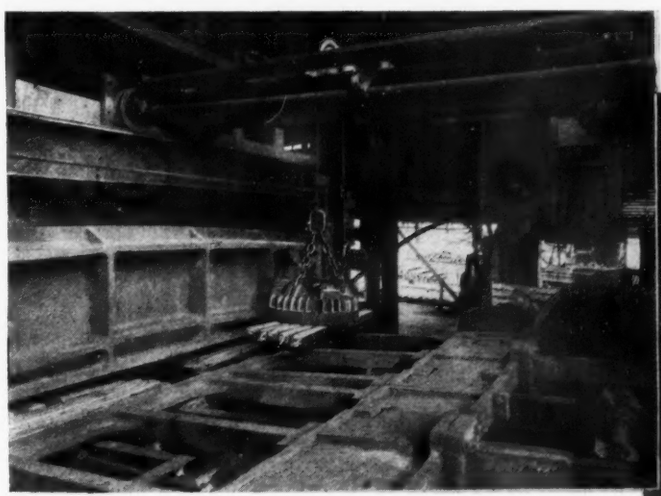


Fig. 2. Loading end of 50-ft. continuous furnace, showing overhead crane, lifting magnet and section of billet yard

Fig. 3. From left to right, outlet of furnace, short roller conveyor and roughing mills

Fig. 4. Strand mills where bars receive five passes

Fig. 5. Finishing mill equipped with die rolls. Spring actuated guide controls feed of bar into rolls

conjunction with the rolling process which gives uniform fibrous structure from end to end of the axle, this stretching operation, which insures dimension, is one of the outstanding features of the new development. In the ordinary method of production, each end of the axle is forged separately in a half die. Dimensions tend to vary appreciably due to the use of excess material at one end, and the center, or most highly stressed, section of the axle is subjected to considerable abuse. In the stretching operation described here, overall dimensions are adjusted throughout the entire length of the axle and no section is stressed more than any other.

After this operation, the axle is allowed to cool preparatory to the electric arc welding operation in which the spring pads are applied. Spring pad blanks are produced from the billet by a similar rolling operation. In their finished form, these spring pads somewhat resemble the tie plates which are placed between railroad rails and ties. However, the top surface is flat, as is the lower surface with the exception of the middle section, which is roll-formed to fit the top flange of the axle very closely. Each pad is clamped tightly at the proper location on the axle and an arc weld is made around the entire joint between the two members.

Following the arc welding operation, the entire axle is heat treated and is ready for machining operations and service.

Fig. 1 illustrates some of the obvious advantages of this axle. As shown, neither the top nor the lower surfaces of the spring pads require any machining. The usual heavy draft is absent on both surfaces so that the slab milling on top and the spot facing on the bottom for the spring clip nuts are eliminated. In the case of the axle manufacturer, this method of construction allows for variable spring spacing to suit different makes of cars while retaining but one type of both axle and spring pad blank. These features, combined with the close limits for dimension for the king bolt centers, promise appreciable production economies.

Of no less importance are the physical characteristics of the axle. The spring pads have been subjected to all sorts of abuse in the course of development work but no axle has failed at the welded joint. An etched vertical section through the length of the axle presents an interesting study. The fibers all run smoothly throughout the entire length of the axle. In fact any fiber can be traced from one king pin boss to the other without any disturbance.

In the case of the axle shown in Fig. 1, the design is very clean, but bosses for wheel lock stops and similar purposes can be formed in the upsetting operations with no difficulty.

The entire process of die-rolling is an interesting angle of the rapidly advancing methods of the firms supplying raw or semi-finished materials to the automotive industry. An outgrowth of the steel industry, this plant has much of the automotive aspect. The combination has resulted in a plant in which materials in tremendous tonnage are handled with great rapidity, although so far as the product and its heating and manipulating are concerned, changes of state are made in a most deliberate manner which insures high quality dimensionally and structurally. While some of the equipment is traceable to conventional steel mill practice, the major portion has been developed for the preparations and specific die-rolling process and is patented.

Steel enters the plant in the form of billets approximately 4 in. square in lengths of 6 to 8 ft. Each heat is segregated and several samples are checked for chemical analysis. Every bar is inspected for protection against flaws. Each heat is labeled and metal tags accompany each lot throughout the plant and continue with the shipped material. Railway cranes unload billets from the cars to inclined steel skids which discharge to a covered bay where an overhead crane and magnet pick up four or five bars at a time for delivery to the loading deck at the mouth of the furnace.

Fig. 2 shows the magnet discharging five billets at the loading deck. In the background is shown a small section of the billet yard and the scales where every charge is weighed. Incoming weights are checked against the weight of outgoing product as a gage of the plant's operation.

A gas-fired furnace equipped with pyrometric control is 50 ft. long by 19 ft. wide and is equipped with two rows of inclined water-cooled skids which descend gradually from the loading to the discharge end. These skids terminate a few feet away from the discharge apparatus and the intervening space is occupied by a firebrick turning table where the heated billets roll over to insure completely uniform heating. Heating is done very gradually and a considerable soaking period is allowed in the 2½ hr. which are required for the passage of each bar through the furnace. Maximum temperature varies somewhat with the analysis of the steel, but the average is around 2250 deg. Fahr.

Near the outlet end of the furnace, the heated billets drop into a pair of transverse water-cooled skids and are pushed out onto a short section of conveyor by a water-cooled ram. The furnace outlet and the short section of conveyor rolls are shown at the left center of Fig. 3. At the terminus of this conveyor the hot billet is seized by tongs and guided into a roughing roll. Two of these roughing rolls are placed alongside of each side and the billet is given three forward passes and two returns, making a total of five passes, which remove the scale produced in the furnace. In this operation the length of the bar is practically doubled and the cross section is worked to improve fiber conditions. The roughing rolls, with a bar which has just been passed through them, are shown in the foreground of Fig. 3. An electric motor of 750 hp. is required for this operation with but one bar in process.

From the final roughing operation, the bar is passed laterally to a battery of strand rolls where the cross section is reduced further by five passes. In both roughing and stranding operations the cross section is reduced at each pass, the form being rectangular. Before the next pass, the bar is rotated 90 deg. by the handler so that increased working results. Three roll mills are used in both operations so that the bar can be returned at the same mill. A stranding operation is shown in Fig. 4.

After the final stranding operation, the long bar is passed through a bullhead which forms the leader, as the semi-finished bar is called, for the final or die-rolling operation. The bullhead roll produces an elliptic section in the case of axle shaft production, which was the work at the time the material for this article was collected. Upon leaving the bullhead, the bar, or leader which is seven to eight times the length of the original billet, passes out upon a long narrow conveyor which maintains the straightness and delivers the bar to the die rolls. Approximately one minute elapses between the discharge of the bar from the furnace and its approach to the die rolls. In this interval, 11 operations are performed. Due to this number, the change of condition is gradual and the fibers are not subjected to sudden shock or excessive working in one operation. But little temperature drop occurs, as the mechanical working of the molecules in the bar almost offsets radiation losses.

At the finishing rolls, the leader again is gripped by tongues and turned on edge and introduced into a spring controlled guide which maintains this position during passage through the rolls. Considerable skill is required to introduce the leader into the rolls at the right time to prevent undue loss of stock. About 10 sec. are required for the passage through these rolls. The resultant bar is about 60 ft. long and contains 24 axle shaft blanks with short connecting sprues.

General characteristics of the die-rolling mill are illustrated by Fig. 5. Drive is taken from an alternating current motor of 650 hp. and a variable speed reduction gear. Speed of rotation of the rolls and the linear velocity of the bar are adjusted to the nature of the reduction made at this point, the size of the part and the heat, which depend on the analysis of the steel.

The die rolls are the principal feature of the entire process. The finish form die is developed around the roll and ordinarily three impressions are made side by side. Naturally the diameter of the roll is determined by the length of the individual piece plus the connecting sprue, or some multiple of this figure, in conjunction with several variable factors which affect the process. Particular attention has been paid to the articulation or indexing of the upper and lower rolls, as any backlash would cause variations in the matching of the bar at the parting or flash line. After the flash is trimmed and ground, axle shafts have every appearance of having been rolled to finished form.

Flash varies with the nature of the article and reduction of area and generally is about ⅛ in. thick. Due to the very nature of the circular rolls, permissible wear is rather slight. Trueness to size of the product is demonstrated by the finish allowances of such parts as axle shafts. On the overall length, ⅛ in. finish allowance is made while on the diameter 1/16 in. is the total allowance for turning, grinding, etc.

These rolls, like all in the preliminary operations, are cooled by jets of water which also assist in keeping the bar clean from scale. As the bar emerges from the finishing rolls, it runs out on a roller conveyor which is designed to maintain straightness. In appearance, the bar consists of 24 axle shafts connected by short circular sprues with a slight flash on each side of each axle blank.

From this conveyor, the bar is shifted laterally to a hot bed by a ratchet type of feeder. The roller conveyor shows near the left side of Fig. 6. Further to the left may be seen the pusher bars which transfer

Fig. 6. Hot bed showing cooling bars. Conveyor from finishing rolls at left. Transfer mechanism at extreme left

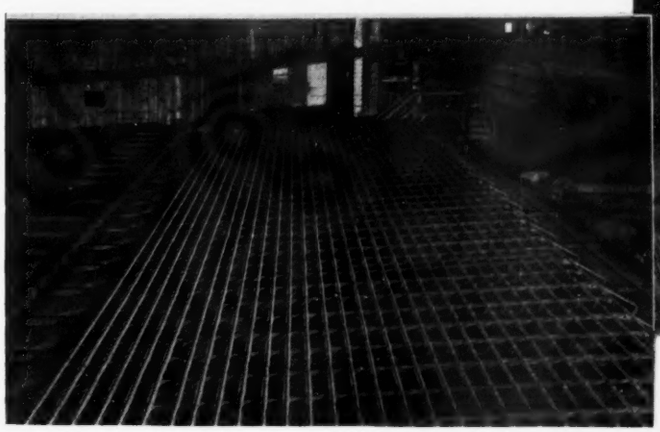


Fig. 7. Shearing department where individual pieces are cut from bars

the long bar to the hot bed. Straight condition across the hot bed is maintained by ratchet dog pusher conveyors which contact with the cooling bars at many points. Fig. 5 shows a number of bars and illustrates the general character of the bars at this stage of production. After cooling to about 400 deg. Fahr., the bar drops off the hot bed to another longitudinal roller conveyor which feeds a shearing press shown in the background. At this stage, the bars have a bright sheen and are particularly free from scale.

Fig. 8. Trimming department where flash is trimmed from individual pieces

All operations from the billet yard to the hot bed inclusive are controlled by one man who occupies a "pulpit" with a full view of the entire shop. At his hand are controls for discharging bars from the furnace. This control is maintained to prevent the loss of heats and possible resultant bad work which might follow a tie-up at any point in the production line. Quality of work is dependent upon a steady routine flow through the various rolls and heat is controlled to accord with a definite time period of fabrication. The rate of discharge from the furnace is the controlling element and as the furnace is filled at practically all times with bars which are brought up to heat gradually, the billet yard operations also are kept in step with progress in the plant.

At the shearing press at the rear end of the hot bed, bars are cut in half to facilitate handling. Where annealing is required by the purchaser or to facilitate subsequent shearing and trimming, these bars are bundled and transferred to a gigantic car type annealing furnace where they remain for 16 to 48 hr., depending upon the nature of the steel.

In the next stage of production, bundles of these bars in either annealed or unannealed state are delivered to the shearing presses where they are cut into correct unit lengths for each piece and the connecting sprues are removed. A section of this department is shown in Fig. 7. Templets and stops are used constantly to insure the correct dimensional characteristics of each piece and the shearing technique has been developed to a high point. The break across the bar is clean and square with practically no cup or deformation of the section. With only 1/16 in. total finish allowance on the diameter, axle shafts turn cleanly to the very end. Inspection in this department and all along the line is comparable to the best automotive practice. Tags which identify the heat number of every lot are particularly prominent in these departments.

Bundles of sheared blanks then are transferred to the trimming department, where again the technique is advanced. Flash is trimmed very closely so that the mark of the operation is somewhat wider than the actual thickness of the flash. On long parts like axle shafts, gear shift levers, etc., the trimming dies are given a shear effect in short opposed sections. This arrangement decreases the load on the press and produces a cleaner finish.

Following trimming, the slight remnant of the flash is ground off in a battery of double-head grinder stands. When demanded, parts are passed through tumbling barrels after grinding, although this practice is on the wane. In a few instances, pickling is required by the purchaser but is not general practice. Finally parts with a few exceptions are bundled in lots of 300 to 500 pieces and tagged with the heat number ready for shipment. On large orders, a considerable quantity of parts in this condition is held in the finished stock bay as a reservoir.

Varieties of automotive forging blanks and rough parts for machining are produced by this die-rolling process. In addition to the new axle described, a number of axle forging blanks of all sizes and types are made. Blanks for camshafts, connecting rods, steering knuckles both plain and compound, spring shackles and clips are regular production. Most of these require further heating and forming by some variation of forging practice. Live axle shafts, gear shift levers, various levers and links, as well as transmission and other shafts, can be produced ready for the machine line. Fig. 9 shows a group of automotive parts which have been die-rolled. All of these go through the regular process of gradual heating and forming which develops a high standard of dimensional and structural characteristics.

THE major units of a Pontiac Six automobile powerplant are employed in a new model marine engine marketed under the trade name of the "Gray Six-Forty" by the Gray Marine Motor Co., Detroit.

The Pontiac engines supplied to the Gray company by the Oakland Motor Car Co. are shipped minus manifold, transmission, clutch, carburetor and distributor. The necessary units to adapt the engine for marine use are fitted by the Gray company.

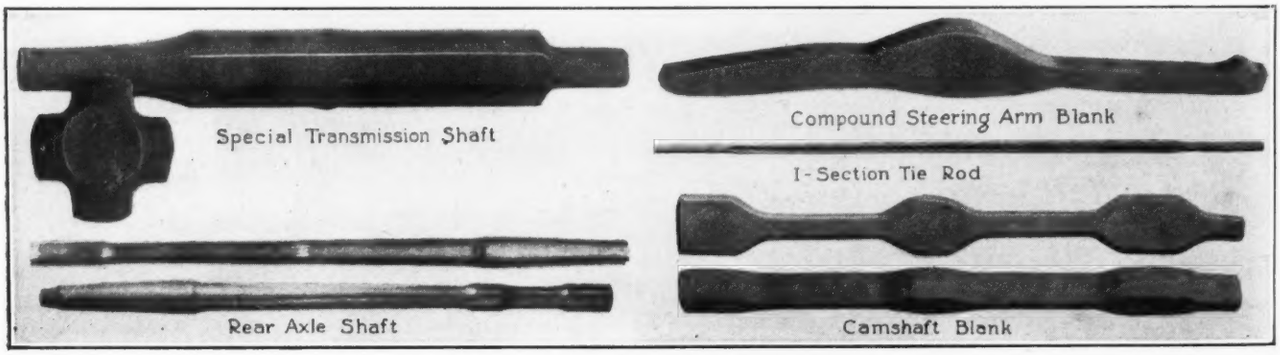


Fig. 9. Typical die-rolled products

Increase *in* Production Facilities *Doesn't* Mean *Overproduction*

Plant extensions during past year not necessarily a sign of impending danger. New factories and equipment always needed to keep up with march of progress.

By Norman G. Shidle

THERE has been a very general increase in capacity to produce automobiles in the last 12 months, not only on the part of those companies whose 1926 records indicate the need for such increase, but also in some cases by those whose sales have been smaller than in 1925. A number of organizations have made only minor alterations in their production facilities, but many, large and small, have spent and still are spending large sums to increase the efficiency of their production.

On the basis of these undoubted facts there is likely to be a rush to wrong conclusions about the future stability of the industry. A direct but superficial interpretation of this continuing trend is that overcapacity is certain to be followed by overproduction and this in turn by overloaded dealers and other signs of an unstable condition. But closer examination of the character and purposes of these increased facilities does not necessarily lead to such a conclusion.

In the first place a certain amount of apparently increased capacity is merely a redistribution of capacity. A rapidly growing concern frequently purchases the buildings or factories of a company which has failed or gone out of business. The growing concern has added to its productive capacity, but the productive capacity of the industry as a whole really hasn't been increased. Auburn, for example, recently purchased the plant of the old Lexington Motor Car Co., the Ansted engine plant and control of the Duesenberg Motors Co. Through these acquisitions, Auburn has increased its ability to produce by several hundred per cent, but no addition to the productive capacity of the industry as distinguished from actual production has been made. Many other instances of somewhat similar nature might be cited.

Then a large proportion of the increased capacity of the industry during the last year has been in the improvement of methods and the installation of new equipment. While buying of new tools and machinery in most cases does result in an increased overhead investment, it must be borne in mind that lower costs per unit manufactured usually are achieved by means of such improved equipment even though its maximum productive capacity be not fully utilized. An efficient, modern machine tool, for example, may very well result in economies sufficient to warrant its purchase even though the actual number of pieces needed be no greater than the number turned out on the obsolete equipment which it replaces. Hence, while expansion has taken place through increase in investment, relatively speaking, this has not been as costly nor fraught with as serious possibilities as other forms of increase in capital expenditures might be.

It must be recognized that constant change is taking place in automotive production plants. Every time an old plant is taken over remodeling is necessary, a greater or less amount of new equipment is purchased and a greater or less quantity of new machinery is installed. Thus millions of dollars' worth of machinery and equipment will continue to be purchased every year, which on account of its improved character will increase the potential productive capacity of the industry but which will not necessarily disproportionately increase overhead charges even though output remain at present levels.

Finally, there is the actual brick and mortar expansion which continues to go forward even as the industry reaches its period of stability. Not even all of this type of expansion can simply be added to past totals nor assumed to offer serious potential possibilities, because it also often is the result of a shift in production needs from company to company, with no longer needed capacity sometimes being of such a character that it merely passes out of the automotive into some other industry, thus constituting no menace of idle overhead to disturb the automotive situation.

Probably the largest building programs of the recent past are those which have been and are being completed by General Motors units.

But many other plants have made extensions in 1926 and are in the process of further expansion. In recent and current news reports of additions to present facilities appear among others such names as Willys-Overland, Moon, Hudson, Rolls-Royce, Studebaker, Stearns, Velie, Cleveland, Dodge, Reo, Auburn, Chandler, Chrysler, Marmon and Nash.

Thus, while the difference between potential production capacity in the industry and probable sales actually is somewhat greater than it ever has been before, there is little cause to believe that the increased capacity is of such a character as to press manufacturers much harder toward overloading than in the past.

General view of Belgian automobile show which opened in the Cinquentenaire Palace at Brussels Dec. 4. Cars of nine nations were exhibited

18 American Manufacturers Among Exhibitors at Belgian Show

Cars of nine nations on display at greatest automobile event of kind ever held in Brussels. Germans back for first time since 1913. High taxes and retrenchment hurt Belgian market.

By W. F. Bradley

WITH 780 exhibitors, representing nine nations and showing 700 cars, the 1926 Belgian automobile show in the Cinquentenaire Palace was the largest ever held in that country. It covered the entire industry from bicycles to trucks. In the passenger car section France had the leading position with 49 exhibitors; there were 18 American firms, 10 Belgians, five Italians, two Germans and one Austrian. The American cars displayed were Auburn, Buick, Cadillac, Chevrolet, Chrysler, Essex, Ford, Hudson, Hupmobile, Lincoln, Moon, Nash, Oakland, Oldsmobile, Overland, Packard, Rickenbacker, Studebaker, Stutz and Willys-Knight.

Technically there was very little in this show not having previously been exhibited at either Paris or London. For the first time since 1913 German firms were admitted to an allied show, but only Opel and Mercedes-Benz took space. Three days after the opening the Opel stand was empty. Mercedes-Benz, now united in one company, showed the two entirely new six-cylinder models, which were exhibited at the Berlin show and which were described in *Automotive Industries* of Nov. 18.

Imperia, Metallurgique and Van den Plaz have been united in one concern. Imperia produces a light car with a 65-cu.-in. sleeve valve engine. Metallurgique specializes on a 120-in. job with a four-cylinder overhead valve engine which now has chain-driven overhead camshaft, battery ignition, and Perrot-Bendix brakes in place of the former Metallurgique type. Van den Plas is one of the most important body builders in Belgium.

Nagant is out with a light six of 109 in. piston displacement, having L-head and battery ignition and to which Perrot-Bendix brakes have been fitted, without equalizers, in place of the firm's own type of diagonally-controlled four-wheel brakes.

Retrenchment Period Ahead

This year's show, which opened Dec. 4 and closed Dec. 15, came at the end of a period of depression and preceded what will doubtless be a period of retrenchment. Stabilization on the basis of 175 francs to the pound sterling has turned the attention of the buying public toward lower priced cars. At the same time increased taxation has accentuated the movement toward economy.

The result of the new registration and gasoline taxes has been to cause 50,000 automobile owners to return their license tags and lay up their cars. Because of this situation it is believed the Government will shortly announce a 40 per cent cut in automobile taxes.

Since the last show import duties have been increased from 5 frs. 75 cent. to 8 frs. per kilo. The French franc, which a year ago was 20 per cent below the Belgian franc, now stands 32 per cent higher, and this added to the new import duty now makes this market very difficult for French manufacturers. Stabilization at a low value has also affected American dealers, some of whom, it is declared, had been selling on a very close margin in the belief that the value of the Belgian franc would increase.

Citroen Has Belgian Plant

Automobile parts paying a lower duty than complete cars, Citroen is now completing an assembly plant, having a covered area of 162,000 sq. ft., in which 30 cars per day will be produced early next year. Chrysler has taken over the Ford assembly plant at Hoboken, and Ford is in a new plant which is working far below capacity.

Present conditions place Belgian manufacturers in a strong position. Minerva is unable to meet demand for the new 122-in. six-cylinder sleeve valve model, which is sold in Belgium at 50,000 frs. with either fabric leather sedan or metal phaeton body. This is the first time an European manufacturer has offered a closed job at the same price as an open one.

The nearest corresponding French car is the six-cylinder Renault, which has a 198 cu. in. engine, selling with fabric leather sedan body at 58,500 francs. Citroen is selling his all-metal sedan at 38,000 francs.

In the truck section a great amount of attention is being paid to engines running on charcoal gas. Minerva has brought out a 4-ton truck fitted with the Etia gas producer. Pipe is building practically nothing but gas producer vehicles. Dasse and Bovey are other firms paying attention to charcoal gas trucks. The market for these vehicles is in the Belgian Congo, where gasoline is both costly and difficult to obtain. Whereas formerly the practice was to add a gas producer to an existing truck, all Belgian makers are now building special engines with high compression, the ratio generally being 6, bigger valves with higher lift and special gas passages.

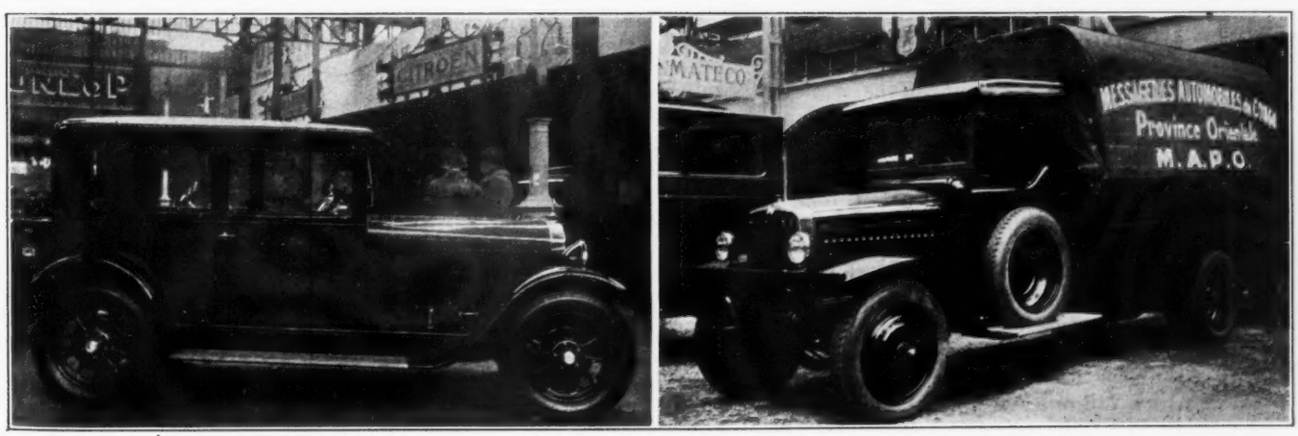
A new company, the Mateco, has just been formed to build charcoal gas vehicles exclusively for the colonies. For a useful load of 2½ tons, the truck has a high compression engine of 110 by 180 mm. (357 cu. in.) and is equipped with big section, low pressure tires. This truck has been designed for running almost exclusively on charcoal gas, the only use of gasoline being to facilitate starting from cold. The engine is built in the Miesse shops, at Brussels.

Pipe has on exhibition a 300 hp. six-cylinder charcoal gas engine which will be mounted in a river tug for service in the Congo. Charcoal being manufactured by the natives at a very low cost, it is claimed that trucks can be run on this gas at a cost only 5 per cent that of liquid gasoline. The use of charcoal gas in Belgium is not extensive.

One Six-Wheeler Shown

The only six-wheeler in the show is one built by the Miesse Co. and equipped with a straight-eight overhead valve engine of 80 by 130 mm. The chassis has open shaft drive to an underslung worm on the forward axle and from this to the rear axle by another open shaft. Equal sized springs are used front and rear, these latter being inverted semi-elliptics pivoted in pairs above and below the two axles. The exhibition chassis, after being fitted with a 50-passenger bus body, will go into service in Buenos Ayres.

Fabric leather bodies are a strong feature of the motor bus section. There are some interesting examples of saloon coaches having removable roofs. These are either of the detachable canvas type carried on longitudinal ribs, capable of being lifted out and brought to the permanent sides of the roof, or a sliding, collapsible type with transverse ribs in grooves, held together by scissors. Externally, they have all the appearance of a normal closed coach.



Left—Single door sedan on the new Mercedes 122 cu. in. six-cylinder chassis. Right—Minerva 4-ton truck designed to run on charcoal gas for use in Belgian Congo

Growth of Car Sales in South Due to Highway Extensions

Thousands of miles of new roads completed in various states during last five years. Survey of progress is made by newspapers. Federal Aid a big factor.

UNDER the leadership of *The Item-Tribune*, a New Orleans newspaper, a summary of the present condition of roads and highway programs in the South has been prepared by editors and publishers of various newspapers throughout the several states.

From their reports the accompanying information has been extracted as having value for motor vehicle manufacturers in indicating the fundamental reason for the present activity in southern markets and the extent to which this market may be extended in the future.

DURING recent years motor vehicle sales have increased more rapidly in the Southern States than in any other part of the country. This very rapid growth has been caused, undoubtedly, by the enormous road building campaigns which have been undertaken during the past few years. A few motor vehicles may always be sold in a territory before good roads have been constructed, but the presence of the automobiles constitutes an ever increasing pressure for road construction. Then, when highways are built a new market for cars is established, and so the cycles continue until all the highways needed for serving the territory have been built and motor vehicle ownership has become widespread.

The Southern States lagged behind most of the other states in the matter of automobile registrations until within the past five or 10 years, during which time comprehensive road building programs have been adopted in nearly every state in this territory. Since that time registrations have been increasing very rapidly and there is no indication that they will not continue to so increase until motor vehicle ownership in the South is about on the same basis of population as in the remainder of the country.

Alabama started its road building campaign July 1, 1922, with the proceeds of a $25,000,000 loan. During the next four years a total of 1645 miles of road was improved under Federal specifications while 2408 miles were under construction. Due to the terms of the bond authorization, its proceeds must be distributed so that not less than $250,000 is spent in each county. Thus it has been difficult to build roads with any systematic relation to through, interstate routes. In spite of this, the work performed in the various counties has made possible a through route north and south which is passable at all times of the year, while passage east and west across the state can be accomplished with little difficulty because of the good work of the several county agencies.

The Arkansas state highway system contains 8300 miles of which 715 miles are paved, 3500 miles gravelled, 700 graded and 3400 unimproved. The state highway department was reorganized in 1923 and a program adopted for the construction or maintenance of 5500 miles of highways. All receipts from motor vehicle registration, from a four-cent tax on gasoline and a 10-cent tax on motor oil, must be used for highway work, according to the 1923 Highway Act.

There are nine national highways passing through or originating in Arkansas and most of them are of concrete, asphalt or gravel—a few short portions being unimproved.

The North Carolina highway program adopted in 1921 called for a system of improved roads to link up each of the 100 county seats in the state. Up to January 1, 1926, the state had completed 1835 miles of hard-surfaced roads, and had graded and completed in sand-clay or gravel surface 2613 miles more at a total expenditure of about $79,000,000.

To finance these improvements a bond issue of $50,000,000 was authorized in 1921 and, with subsequent issues, a total of $85,000,000 has been made available for road work. Taxes on motor vehicle licenses and gasoline have paid the entire bill for road improvements and not a cent has thus far been levied by direct taxation—and automobile revenues are constantly increasing.

In carrying out the program of connecting county seats attention was also given to trans-state travel so there are several routes over which motorists may travel across North Carolina in either direction over improved roads.

Progress in South Carolina

The state highway system of South Carolina includes about 5000 miles of which 3200 are included in Federal Aid projects. Of this total 303 miles are hard surfaced, 3300 have been surfaced with earth or gravel and about 1400 miles are still unimproved. About 4600 miles of the system are being constantly maintained and improved by the highway department at a cost of nearly $2,500,000 each year, exclusive of new construction.

Revenues are obtained entirely from registration fees and gasoline taxes under the pay-as-you-go plan adopted by the state in 1923. In 1926 these receipts are expected to total about $5,000,000, Federal Aid allotment will be $1,100,000 and will provide a fund for new construc-

tion, after all maintenance costs have been paid, of about $3,500,000. In addition to this, the counties are raising money for road work on an equivalent basis with the state funds so that altogether about $7,000,000 will be available for 1926 construction expenditures.

Although the Florida State Highway Department was organized in 1915, lack of funds prevented it from making much progress toward improving road conditions until 1922 when a combination of an ad valorem automobile license tax, Federal Aid allotment and a two-cent gasoline tax provided about $3,750,000 for road work. Since then revenues from these sources have steadily advanced until receipts for 1925 were over $10,000,000 and about $13,000,000 is expected during 1926.

Taxes Used for Maintenance

Practically all of these receipts are used directly in construction and maintenance work so that, without the aid of bond issues, about 5000 miles have been improved to date. Of this, the state has constructed nearly 1300 miles while the remainder has been built by the several counties.

Georgia has a state system of about 6250 miles of which nearly 800 miles have been surfaced and 460 miles are under construction. Over 1300 miles of sand, clay and soil roads are included in the system and some 400 miles of roads of this type are under construction at the present time.

Progress was commenced with the formation of a highway department in 1919, but lack of funds has slowed up the work considerably. Nearly $32,000,000 has already been expended and uncompleted projects amount to over $13,000,000 more. Funds for new construction are obtained principally from gasoline taxes and Federal Aid. Present tax is 3½ cents per gallon, of which one cent goes to the counties for road work, one cent is devoted to a special state purpose and the remainder has been available to the state for highway work. Beginning with 1927 all of the fuel tax revenues will be devoted to highway work.

Kentucky Development Slow

In Kentucky, a state road system containing about 10,000 miles was laid out in 1920, but much of it has never been surveyed and no through road has yet been completed. There are few hard surfaced roads and the high cost of maintenance for sand and soil roads has required so large a part of the available funds that new construction or improvement of existing roads has been rather slow. Progress is expected to be obtained now through a County Aid system by which the state offers to put up $3 for each $1 alloted to road work by the counties. In this way a large number of counties have been induced to issue bonds for road work.

Louisiana has a very comprehensive highway system brought about mainly by the introduction into the constitution of 1921 of a mandate requiring a complete system of through highways and connection of counties with that system. About 4300 miles have been completed already and some 700 miles are expected to be finished this year.

These roads have been built on the pay-as-you-go plan so far as the state is concerned—Federal Aid of about $1,000,000, license fees and a fuel tax having provided sufficient funds for carrying out the program. Smaller political subdivisions may issue bonds for road purposes; the state matches these issues dollar for dollar, and the money is spent in the particular district where the bonds were raised.

Over 2500 miles, or 17 per cent of the total road mileage in Maryland, have been improved. All the main arteries of travel have been completed and the only new construction problem left in this state is to build lateral roads to connect the trunk lines. New construction is financed by appropriations from the general funds of the state while maintenance is paid for out of license fees and gasoline taxes.

In Mississippi there are over 3300 miles of roads improved to meet the first class standard of the Federal Government. The total state system comprises about 8000 miles of which 3700 miles are eligible for Federal Aid. Practically all of the receipts from license fees and fuel taxes are required for maintenance work so that new construction has been paid for by appropriations and Federal Aid. Nine national highways traverse the state.

At the end of 1926 Missouri will have completed more than half the 6740 miles of roads included in the state primary system. When completed, the entire system contemplated will cost cost over $187,000,000. This cost is being taken care of by a $60,000,000 bond issue, various county bond issues, Federal Aid and the usual registration and gasoline taxes. Eleven national highways cross the state.

Oklahoma Plans Laid in 1924

The Oklahoma highway system dates only from 1924 when a progressive highway act was passed by the Legislature. Some 550 miles of roads were included in the system and they are being improved as rapidly as funds permit. All these roads are maintained by the state through a system of patrols and, as rapidly as possible, improvements are being made to them in the order of their importance to the whole system.

Since 1918, when the Tennessee highway department was organized, over $45,000,000 has been expended in constructing nearly 2300 miles of roads of various types. Over $5,000,000 was provided during 1925 by license fees and fuel taxes, which, with Federal Aid, was sufficient to carry on the road program without resort to appropriations or bond issues.

At the present time road construction has caught up with traffic so that future work will be carried on without inconvenience to the traveling public. The entire state system is maintained by the state and nearly $2,500,000 is being spent for this purpose yearly.

Texas has over 10,000 miles of roads built for speed in all weather and 13,000 miles more which are kept in passable condition except at infrequent intervals. Much of this work has been done since 1921 when there were slightly over 2000 miles of completed roads in the state.

Virginia has a state highway system of about 5000 miles of which 1900 miles of concrete and macadam roads have been completed. Improved soil and gravel roads make up 1200 miles while the remainder has been graded but not otherwise improved. Maintenance funds are derived solely from license fees which provide about $4,000,000 annually. Construction funds totaled nearly $10,000,000 this year and are derived from Federal Aid, convict labor, gasoline tax, property tax and appropriations for supervision.

West Virginia Issues Bonds

The state highway system of West Virginia dates from 1920 and bond issues totaling $50,000,000 have been made to cover new construction work since then. The system contains 3800 miles of roads of which 2800 have been improved or are now under construction. Completed hard-surfaced roads amount to 1500 miles with 235 miles under construction.

E. T. Strong

"I'm Starting All Over Again," Says E. T. Strong New President of Buick

Former implement mechanic who now ranks among leading executives in the industry contends that every change in position means starting again at the bottom of the ladder.

By Lewis C. Dibble

E. T. STRONG has a unique theory of success. He revealed this when discussing his recent appointment as president of Buick.

"Every time a man gets a promotion or takes a new position his friends seem to think he has taken just another step up. But it isn't so.

"When a man changes his occupation he goes right back down to the bottom of the ladder and starts all over again. He has an entirely new problem at hand. He has new and added responsibilities. He must make new contacts. He is in the same position as the day he started out.

"When I went to work for Cowham I had one idea and that was to make good with Cowham. When I started out to be an engineer I had it all to do over again. Then when I went with the International Harvester Co. new contacts had to be made, new people satisfied and I had it all to do over again. Then when I went to work as a Buick salesman for Dick Collins new conditions presented themselves. When Buick decided to transfer me to Flint to become general sales manager I found myself right back down at the bottom of the ladder.

"What has been accomplished on past jobs has no bearing on the present situation. Past experiences no doubt make one better qualified to tackle a bigger job, but you have to start in new again. A man's life fluctuates just like the stock market. It goes up and down several times."

It took a pessimist to instill in Strong the determination to follow a career that has made him one of the leading executives in the automotive industry.

He was a small-town lad with a job setting up farm implements back in the nineties when the great turning point came in his life. He thought he would like to turn from the work of an ordinary mechanic and become a salesman. He put the proposition up to his boss.

"You'll never make a salesman," his employer said in a most positive manner. Strong resented that. Right then and there he got mad. He thought that the boss was wrong and that he was right, and he determined to prove for his own satisfaction and that of everybody concerned that he could be a salesman.

He has proved it most convincingly with Buick. Ten years ago he was called to the factory at Flint to take over the reins as general sales manager. For the last nine years Buick has led all companies in the industry who are members of the N. A. C. C. in volume of sales. Since Buick was started 22 years ago, 1,750,000 cars have been sold and Strong has directed the sale of 1,500,000 of these.

Strong was born in 1877 at Imlay City, Mich., a peaceful agricultural community in Lapeer county, only about 35 miles from Flint, where he was later to gain a high position in the automobile world.

His father operated a combination blacksmith and wagon repair shop and sold farm implements, and much of his time was spent around the shop doing chores and helping out on odd jobs. While he was attending high school he worked summers for his father, learning the mechanics of farm machinery.

As a mechanic the small-town lad soon became very proficient and he applied to Mr. Cowham, who was state

agent for the McCormick Harvester Co., for a job setting up machines. Cowham, located across the state at Jackson, received Strong's application in the mail and though he had never seen him, hired him to set up mowers and binders for farmers.

That first job loomed big. It presented an opportunity which Strong grasped quickly and he soon demonstrated the systematic method he was to follow in attacking all other problems and undertakings thereafter.

In his travels about the country, setting up farm machinery, he came in contact with various experts. He observed that each expert usually had the knack of doing some particular thing exceptionally well, and from it he got an inspiration. "It struck me that if I could take for myself the best ideas of these experts, if I could do *all* the work connected with my job as well as most of those experts did one part of it, I'd be the best expert in the bunch. So I set out with that in mind. I tried as best I could to embody the best practices of them all in my work.

A System That Works

"This system was so successful that I never forgot the formula. And I have tried ever since to do the same thing. A man, no matter what his position, can learn something new about his job every day. The young fellow just starting out ought to try to do everything just a little bit better than it has ever been done before. He can do this by watching and learning how other folks do things well, make their ideas and practices his own—and before he knows it he will be a more valuable man, all around, than any of the rest of them.

"I was a kid trying out a system. The system worked. It was a success. And I learned a lesson from the first success that has stood me in good stead ever since. We hear people say that a man must learn his lessons from his failures. It's my idea that we ought to learn more from our successes. Lessons learned from failures are negative. Those learned from successes are positive. I'm for the positive lesson. When a man's up against a problem it's better for him to think back and figure out how he solved a similar problem than it is for him to think back and remember he failed."

Strong apparently proved a success at setting up mowers and binders that summer, for the next year the company sent him to the Red River Valley to do similar work. Then he was transferred back to Michigan, still working as an expert set-up man. He was in his early twenties, and, according to his own description, he was a tall, rangy, gawky country lad. Anyway, the thought struck him that there was no future in this business of "experting" and he determined that he would be a salesman.

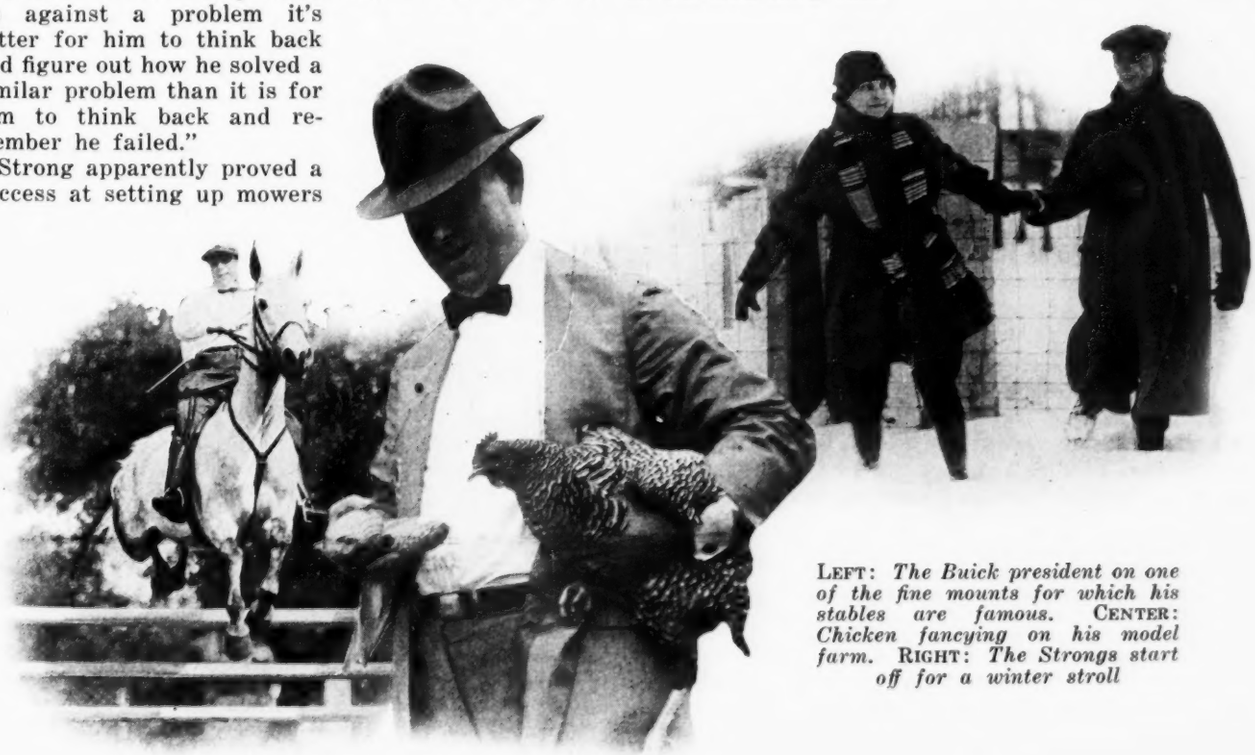
One day he went to the man in charge of the territory where he was setting up machinery and told of his desire to go into the sales end of the business.

"Sales," replied the man in laughter. "You get into sales? Why son, you can't sell anything. Stick to your 'experting,' boy; you'll never make a salesman."

Strong was mad. He went to his friend Cowham at Jackson and the latter also tried to discourage him. But determination was in his mind. "So you think I can't sell?" said the young mechanic. "January is the hardest month in the year to sell binders and mowers. Send me out the first of January. Give me the toughest territory in the state if you want to. At the end of January I'll leave it to you whether I get the job and you can pay me what you think I'm worth."

On the strength of this proposition he was assigned to territory in Lapeer county in January, 1899. With a horse and cutter he started out in the dead of winter to sell the farmers what they had been accustomed to buying in the summer. Strong knew his product from A to Z and he knew farmers. He realized that unusual methods must be resorted to if he was to get farmers to lend him an ear at this particular time of the year.

How he did it is an interesting phase of the story. Farmers were sawing wood so Strong decided to saw wood. He made it a practice to go to the "back 40," take one end of the saw and lay into it for an hour or so, and, finally winning the friendship of the farmer, the subject of mowers and binders was brought up. If the farmer was at some other task Strong would join in the work. Did he sell? He did, because he had that knack of understanding men.



LEFT: *The Buick president on one of the fine mounts for which his stables are famous.* CENTER: *Chicken fancying on his model farm.* RIGHT: *The Strongs start off for a winter stroll*

For two years Strong had many unusual experiences selling farm implements, then he decided he wanted a more thorough knowledge of mechanics. He wanted to know what made engines run, how they were built and how to take care of them. Finally he decided he wanted to take a course in practical engineering, so he went to Cleveland. Here he went to work as a stoker and for a year worked as a helper, at the end of which time he successfully passed his examination. He was told that if he would successfully run an engine for a year, without accident, he would be issued papers as a first class stationary engineer. He continued another 12 months and received the papers, which are among his most valued possessions.

With the organization of the International Harvester Co., in 1903, he joined that organization, working out of Detroit as a canvasser. He was one of the first salesmen in the territory to realize the value of an automobile and he acquired one of the old one-cylinder Oldsmobiles. In those days there was no service station at every crossroads and it was up to Strong to keep his machine in repair. Like everything else he made a methodical study of the mechanism of the automobile, and, when the I. H. C. finally entered the gasoline engine field, he was found so exceptionally well-informed on the operation of engines that he was immediately assigned to sell them. Then came the time when I. H. C. made the old high-wheeled gasoline buggies, and Strong sold them.

Cruising about the Great Lakes in his cruiser Grethea is one of Mr. Strong's favorite outdoor sports

The new Buick president got his first introduction to Buick in 1908. He was in Lapeer when he was attracted to a Buick Model 10, one of the little white Buick four-cylinder roadsters which were a sensation in their day and which Bill Leisaw, a Buick salesman, was driving. While he was admiring the car the town fire alarm rang.

Leisaw invited Strong to go to the fire. Strong declared he'd go anywhere to get a ride in the car, and while they were at the fire he placed an order for one. This he used until he left the International Harvester Co. in 1910 to join Buick.

Strong could see great possibilities in the automobile. He knew through personal experience that a car could cover more territory than ever could be covered with a horse. He saw the day coming when people would demand cars, and he finally decided to be in on the ground floor selling them.

When the implement salesman approached R. H. Collins, the Buick sales manager, for a job in 1910, the latter told him to stick around six months or a year and the company would give him a job. But Strong replied that he didn't propose to loaf around for six months or a year for two reasons, first, because he had a wife and children to take care of, and second, because life was too short.

"You're hired," said Collins.

In his early days with Buick he was employed as special traveler. He concentrated and studied all the various methods of selling automobiles and put the best ideas he could find into his own practices. It won him promotion, for he was soon selected to manage the Buick branch at Buffalo. The Buffalo branch was soon one of the strongest in the country under his direction, and then the company sent him to Indianapolis where he accomplished a similar task. Next he was picked to direct the destinies of the important Chicago branch, and at the same time was given charge of sales operations at Milwaukee. Again Strong was a success.

In 1917 Collins, who had built up a country-wide reputation for himself as "Trainload" Collins through his large shipments of automobiles to different sections, resigned. Buick was faced with the problem of selecting a worthy successor and Strong, because of his successes in the field, was picked for the position.

That was 10 years ago. Strong, fresh from practical experiences in the field, went to Flint and set about his new tasks with the same method he had used in attacking other problems. And again his method worked. No better proof of this can be found than a review of his sales achievements since he took the job.

Anyone who knows Strong will tell you that he has an unusual way of doing things because he is so exactingly thorough and systematic. There is method and reason in everything he does. He believes that anything that is worth doing at all is worth doing well. He goes to the bottom of everything, studies his problems in their every detail and strives to know their complications. It is said that nothing comes up, even ever so small, that he doesn't give it his attention. He takes one job and finishes it before he takes on another. He's a man who has a wonderful power of concentration.

He goes in for play as he goes in for work, and he enjoys a diversity of amusement.

Unlike most executives, golf is not his favorite sport. Though he belongs to the Flint Country Club he is more liable to be off with Mrs. Strong for a canter through the country on the beautiful mounts for which their stables are famous. Again one will find him at the Strong summer home at Long Lake, 12 miles from Flint, where he delights in working around the engines in his speed boats or swimming for hours at a stretch. Another occasion might find him and Mrs. Strong off with several of their friends for a quiet cruise on the Great Lakes in their cruiser Grethea, which Mr. Strong himself designed and which was launched a year ago.

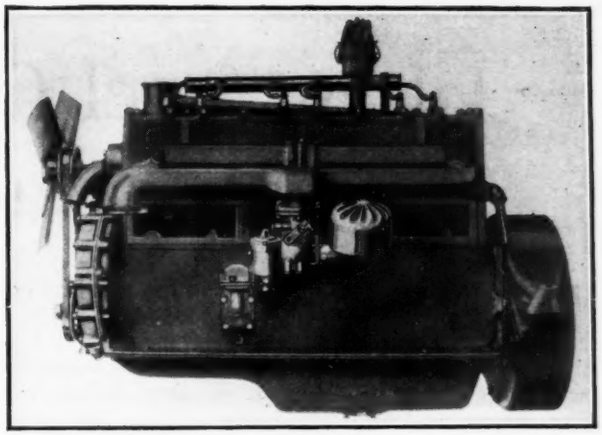
Model Farm One Hobby

There are still two other places where the Strongs like to go. One is to their model farm near Imlay City and the other is to their attractive lodge on the picturesque Casade River near Grand Rapids.

Thus, it appears that practically all of E. T. Strong's pastimes call him under the invigorating influence of the great outdoors.

Summing up the events in his business life which stand out most vividly in his memory, Strong never forgets to tell of the advice that he got from his boss in the implement business. He thinks it is the best advice for a salesman he ever heard. "Strong," the boss said, "there's only one thing I want to tell you before you go out into the territory, I want you to do everything you tell a customer you'll do—but be damned careful what you say you'll do."

Two Truck Models Added to Republic Line



Left side view of Lycoming Model TF engine employed in Republic Model 60 truck

Model 50 rated at 1½ to 2 tons and Model 60 at 2 to 2½ tons. Engines are Lycoming. Bevel gear axles employed.

THE Republic Motor Truck Co., Inc., Alma, Mich. has announced addition of two new trucks, Models 50 and 60, to its line. Model 50 is rated at 1½ to 2 tons while Model 60 is rated at 2 to 2½ tons. Bevel gear axles are employed on both models. The frames are tapered from the front hangers of the rear springs to their ends, which permits frame heights of 25½ in. on Model 50 and 26½ in. on Model 60 without a kick-up over the rear axle.

Service brake in both models is mounted on the propeller shaft at the center bearing support and consists of a single drum with two shoes mounted on a tubular member. Emergency brakes are of the internal type operating on the rear wheels.

Model 50 is powered with a Lycoming Model 4SG, six-cylinder, 3½ by 4½ in. engine which develops 50 b. hp. Full pressure lubrication, gear type oil pump, unit transmission, three-point suspension, centrifugal water pump and an 18 in. ball-bearing fan are some of the main features of this engine.

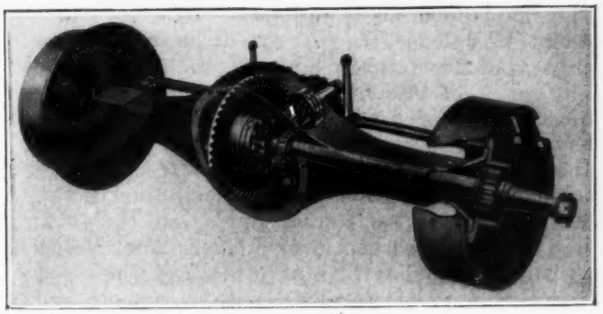
Ignition is provided by an Auto-Lite generator and battery system. The carburetor is of Stromberg make, and of the float feed type. An air cleaner is standard equipment. The multiple dry disk clutch is completely inclosed in the clutch housing. The selective sliding gear transmission provides three speeds forward and one reverse. The two-piece tubular driveshaft is fitted with three universal joints and a ball-bearing center support.

Springs are of chrome vanadium steel, 39 by 2½ in. in front and 56 by 3 in. in the rear. Metal spoke wheels are fitted front and rear with 30 by 5 in. cord tires—dual rear.

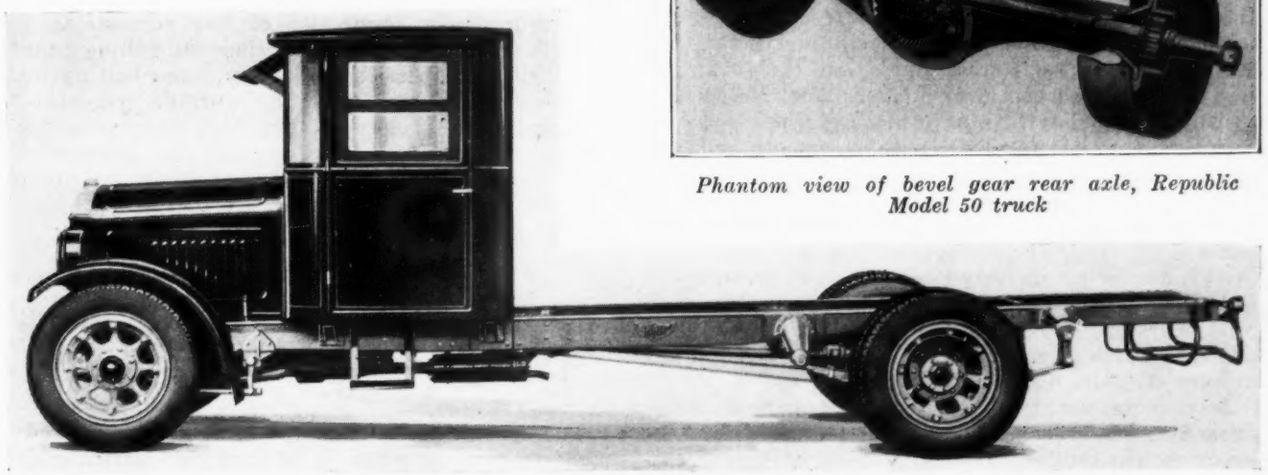
The pressed steel frame is 6 in. deep, with 2½ in. flange pressed from ¼ in. stock. Wheelbase is 154 in. and recommended body length is 11 ft. Tread is 60 in. front and 60½ in. rear. Starting motor, 6-volt battery, ammeter, horn, headlights with dimmer and tail light are included in the electrical system. Wheelbases of 142 in. and 170 in. are also available.

Model 60 powerplant consists of a Lycoming Model TF, six-cylinder, 3⅝ by 5 in. engine which develops 70 b. hp. Other parts are similar to the Model 4SG engine.

Most of the details of the Model 60 are similar to Model 50. Tires on Model 60 are 32 by 6 in.



Phantom view of bevel gear rear axle, Republic Model 50 truck



General view of new Republic Model 60, 2-2½ ton truck

Jalcase Steel Combines Strength and Machineability

IN the past good machining qualities and high physical properties seem to have been more or less mutually exclusive in steel.

Jones & Laughlin Steel Corp., Pittsburgh, Pa., which has long specialized on free-cutting steels, has attempted to eliminate this apparent incompatability between good cutting and good physical qualities and has brought out a free-cutting steel in several grades, which it is introducing under the trade name of Jalcase. A brief reference to this steel appeared in *Automotive Industries* of Sept. 2, 1926.

It is pointed out by the manufacturer that the free-cutting qualities of a steel depend not only on the specifications but also on the skill of the metallurgist in insuring chemical and metallurgical uniformity in the ingredients that go into the material. As regards the ease of machining of the new steel, if ordinary Bessemer screw stock (S. A. E. No. 1112) is placed at 100 per cent, Jalcase rates 90-95 per cent, open hearth screw stock (S. A. E. No. 1120) at 60-75 per cent, and S. A. E. No. 1020 (a low-sulphur steel) at 50-55 per cent.

It is recognized that results obtained in machining depend upon many other factors besides the qualities of the steel, and the figures given above are not to be taken as absolute but as representative of average results.

The structure of Jalcase is said to be such that it offers comparatively low resistance to the penetration of cutting tools, with the result that the tool does not attain an excessive temperature and hence lasts longer before it needs to be reground. The percentage of mineral inclusions in this steel, such as alimina, silica, silicates and iron oxide, which have a tendency to act as abrasives and to accelerate tool wear, has been kept down to a minimum. The only inclusion found in Jalcase to any extent is manganese sulphide, and this actually improves the cutting qualities. The result of this freedom from abrasive inclusions, the manufacturer points out, is that tool life is materially increased, which in turn has a favorable influence on production. Being free-cutting, the amount of power consumed in machining the steel is less than with other similar steels, and the advantage claimed in this respect over S. A. E. steel No. 1020 is 18 per cent. When turning a piece of Jalcase a long chip is obtained, together with a smooth surface, which is of advantage when there are no further finishing operations.

The new steel is supplied in both hot-rolled and cold-drawn form, and the physical properties of the two grades in the untreated condition are given in the following table. The physical properties of the hot-rolled bars are largely influenced by the bar diameter and the figures given in the table for this grade apply to bars of ¾-in. diameter.

Jalcase responds to heat treatment, and water quenching is recommended, particularly for the lower carbon grades. With the steels of higher carbon content oil quenching may be used successfully.

HOT-ROLLED JALCASE GRADES

¾ In. Rounds Hot-Rolled	Carbon .10–.20	Carbon .15–.25	Carbon .25–.35	Carbon .30–.40
Tensile Strength, Lb. Sq. In...	55000–67000	60000–72000	72000–95000	80000–110000
Yield Point, Min., Lb. Sq. In...	.5 TS	.5 TS	.5 TS	.5 TS
Elongation in 2 In., Min. ..	30%	25%	20%	18%
Reduction of Area, Min...	50%	45%	40%	32%
Brinell Hardness	100–140	110–150	140–190	160–220
Scleroscope Hardness ...	8–18	10–20	19–28	22–35

COLD-DRAWN JALCASE GRADES

¾ In. Rounds Cold-Drawn	Carbon .10–.20	Carbon .15–.25	Carbon .25–.35	Carbon .30–.40
Tensile Strength, Lb. Sq. In...	70000–90000	75000–95000	85000–110000	90000–120000
Yield Point, Min., Lb. Sq. In....	.75 TS	.75 TS	.75 TS	.75 TS
Elongation in 2 In., Min.....	16%	15%	14%	13%
Reduction of Area, Min....	40%	35%	32%	30%
Brinell Hardness	140–160	150–190	180–220	190–240
Scleroscope Hardness ...	17–25	20–29	27–35	30–40

Quenching temperatures are the same as for other steels of similar carbon content, but as results are dependent also on equipment, method, and precision of control, it is recommended that the best quenching temperature be determined experimentally in any particular application. In cases where a variation in the quenching temperature from that used with the corresponding S.A.E. steel has been found desirable, it has been usually 50-100 deg. lower. The deformation on quenching is said to be exceptionally low with these steels.

Penetration of carbon in box carburizing at 1650 deg. Fahr. is said to be at a higher rate than with either S.A.E. 1020 or S.A.E. 1120 steel, which favorably affects costs. Figures supplied by the makers show that Jalcase has a similar advantage also at other carburizing temperatures.

Examination under the microscope of a fracture of the case of a properly treated carburized part of Jalcase steel is said to show a high martensitic structure with a minimum proportion of free cementite. The steel is said to have good forging and rolling properties. These properties are largely dependent upon the prasticity of the steel at the working temperature. Making physical tests at such high temperatures involves considerable difficulty, but the problem has been solved in the laboratories of Jones & Laughlin and the following figures are given of the properties of this and similar steels at 1800 deg. Fahr.

	Tensile	Elongation	Reduction
Jalcase	6000 lb. sq. in.	80.0%	99.5%
S.A.E. 1020	7100 " " "	76.0%	98.2%
S.A.E. 1120	8200 " " "	66.5%	99.0%
S.A.E. 1112	7400 " " "	66.0%	98.0%
S.A.E. 1035	6700 " " "	80.0%	99.5%

The special qualities of the steel are considered of particular value when it is used for intricate drop forgings.

EDITORIAL

A Christmas Wish

¶ Despite its desire to be considered primarily as a useful tool to you in your business, *Automotive Industries,* down deep below its practical and utilitarian surface, wants you and all the rest of its subscribers to think of it most of all as a friend.

¶ A friend can help without patronizing, praise without flattering and criticize without hurting. Since most concerns of life are of a practical nature, a friend properly may engage himself chiefly with practical things; but through all of your relations with him there will be a warm glow of mutual understanding and sympathy.

¶ For a publication—whose chief expression must be in the relatively harsh terms of type and paper—the task of being an intimate friend to thousands of individuals is perhaps an insurmountable one; yet the coming of Christmas each year inevitably points the arrow of our desires directly toward such a goal.

¶ So with all the sincerity and affection of the most human of individuals, *Automotive Industries* sends you its heartiest wishes for a Merry Christmas and pledges its best effort as a friend in helping you to traverse the New Year with happiness and prosperity.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, December 23, 1926

Production Hits Low Mark as Plants Prepare for 1927

PHILADELPHIA, Dec. 23—Automobile production is at the lowest point since 1921 as a result of drastic curtailment by most of the factories and complete temporary shutdowns by several of the largest plants. Trucks are holding up better, but the combined total of output for the United States and Canada of passenger cars and commercial vehicles for December will be considerably under 200,000.

Immediately after the first of the year, however, there should be an appreciable upturn in operations. Current orders to equipment and material makers do not suggest a resumption of anything approaching full-time production, but the factories that have been closed down will be in position to start fairly heavy shipments to distributors and dealers. Sales of cars are still slow in nearly all sections of the country, but trucks are holding up much better. Used car stocks are heavy and moving very little. Export sales are under the level of a year ago.

The price situation is essentially unchanged, and the trade does not look for any definite downward trend, though there is a likelihood that readjustments will be made at the time of the national show in New York. It is not felt that the market now is in position to respond sufficiently to the price stimulus, and there may be some minor advances before long.

Mergers continue to be discussed, though one rather important plan that would have involved cooperation in marketing of motor products appears to have fallen through. Difficulties beset the paths of negotiators for the combinations, but there is still a probability that one or two will be completed.

M. & A.M.A. Shows Sharp Sales Decline

NEW YORK, Dec. 23—The November recession in automotive parts and accessory business has been more than seasonal in volume, according to the Motor & Accessory Manufacturers Association, which reports that sales during the month just passed have dropped to the lowest point this year.

Parts and accessory manufacturers reported business as picking up somewhat this month, especially original equipment. This was attributed to an anticipated increase in automobile production after the first of the year.

The November index figure on original equipment dropped to 79, compared with 100 for January, 1925, the basic index. This compares with 125 in October and 151 in September this year.

Replacement parts shipments yielded an index figure of 94 for November as compared with 116 in October. On accessories the figure is 83 as compared with 109 in October, while the service equipment figure was 119 as compared with 145 in October, due to price reductions, some of which were brought about by improved production and distribution and others by intensive competition.

11 MONTHS' OUTPUT CLIMBS TO 4,293,228

WASHINGTON, Dec. 23—Passenger car and truck production in the United States and Canada during November totaled 265,641, the lowest output for any month during 1926. Passenger car output in the United States and Canada was 219,479 and 6774 respectively and truck production was 36,334 and 3054. For the year to date the total output now is 4,293,228

Monthly totals for 1925 and 1926 follow:

	Cars	Trucks	Total
1925			
Jan.	213,851	28,203	242.054
Feb.	253,955	34,482	288,437
March	334,214	45,180	379,394
April	393,262	47,984	441,246
May	384,548	45,719	430,267
June	366,510	38,151	404,661
July	360,124	41,870	401,994
Aug.	223,517	37,850	261,367
Sept.	274,227	60,482	334,709
Oct.	408,017	46,013	454,030
Nov.	337,435	40,048	377,483
Total	3,549,660	465,982	4,015,642
Dec.	286,141	34,488	320,629
Total	3,835,801	500,470	4,336,271
1926			
Jan.	284,703	33,461	318,164
Feb.	334,524	41,685	376,209
March	399,105	49,233	448,338
April	401,836	53,887	455,723
May	394,569	51,343	445,912
June	358,365	47,115	405,480
July	329,950	41,921	371,871
Aug.	393,040	47,907	440,947
Sept.	363,537	51,299	414,836
Oct.	300,142	49,965	350,107
Nov.	226,253	39,388	265,641
Total	3,786,024	507,204	4,293,228

Falcon to be Seen at Private Exhibits

DETROIT, Dec. 22—The new Falcon-Knight six, which will be in production in March by the Falcon Motors Corp., will be shown privately at New York during the national automobile show. Executives of the corporation will maintain headquarters at the Belmont. The car will also be shown privately at Chicago, and headquarters will be maintained at the Congress.

A. E. A. Picks Mackinac

CHICAGO, Dec. 23—The board of directors of the Automotive Equipment Association has made arrangements to hold the 1928 summer convention at the Grand Hotel, Mackinac Island. The convention will be held the week of June 10.

Hupp to Intensify Sales Work in 1927

DETROIT, Dec. 23—Hupp Motor Car Corp. will inaugurate in 1927 the most aggressive sales and advertising campaign which it ever has undertaken, according to plans told at the meeting of district sales managers just held. Speakers at the meeting were R. S. Cole, general sales manager, and Frederick Dickinson, advertising and assistant sales manager. The program includes intensive follow-up and educational work in the field.

H. E. Rose has been appointed to succeed Mr. Cole as sales promotion manager. Mr. Rose was sales manager for the Hupp New York distributor and formerly had been connected with the factory as a representative.

U. of P. Bureau to Train Salesmen for Studebaker

SOUTH BEND, Dec. 23—The Research Bureau for Retail Training of the University of Pittsburgh has been retained by the Studebaker Corp. of America for the year 1927, to cooperate with Studebaker's training department in the development of retail salesmen.

The training will be based upon a scientific study of company policies, history and organization, values, materials and processes, selling difficulties and their solutions, distribution of time and duties of salesmen, forms and procedures and technique of training.

Hudson Down for Holidays

DETROIT, Dec. 22—Hudson Motor Car Co. will close this week for Christmas vacations and will open Jan. 3 with a schedule of 11,000 cars for January.

Truck Makers Join in Advertising Plan

Establish Fund for Coordinating Efforts in 1927—Will Hear Dealer Problems

DETROIT, Dec. 22—Motor Truck Industries, Inc., is advancing plans for its advertising program which will be carried out in 1927 as result of the creation of a fund of $35,000 at its November meeting. The fund is to be made up of subscriptions from truck maker members ranging from $100 to $800 according to annual volume, with parts maker members supplying additional amounts needed.

Under its plan the association will work out standardized advertising designs for its members and will provide a name plate which will be used in conjunction with all advertising. The name plate also will be built into all trucks built by association members.

The sales and finance committee of the association is making plans for a conference with non-member truck companies at which effort would be made to develop a basis for sound sales and financing methods in the truck industry generally. The committee also has created a credit bureau which will develop a dealer rating system.

Under plans of the association, one or more dealers will be invited to attend meetings in the future so that opportunity may be presented for hearing and acting upon retail problems as they arise.

Boston & Maine Starts Store Door Deliveries

BOSTON, Dec. 21—The Boston & Maine Railroad, acting through its motor truck subsidiary, the Boston & Maine Transportation Co., has inaugurated a store-door delivery service utilizing steel freight containers which are interchangeable between truck and train.

The containers, which have a capacity of five tons, may be loaded inside a shipper's factory in Boston, locked securely, transferred by truck at any time before 6.30 p. m. to special cars on the railroad and carried by train to Worcester and Springfield in time for delivery before the next business day begins.

Handling of short haul less-than-carload shipments is greatly reduced, as is also damage to freight and losses due to theft.

Issues Electric Booklet

CLEVELAND, Dec. 22—Automotive Electric Lighting and Lighting Service is the title of a new booklet which has just been published by the Automotive Electric Association and is now being distributed. The major portion of the text is devoted to detailed explanations of the inspection, test, adjustment and maintenance of automotive headlighting equipment and the description of the equipment needed in this work. A list of lenses and depressible beam devices approved by the Eastern Conference of Motor Vehicle Administrators also is included.

Tire Report Shows Inventory Increase

NEW YORK, Dec. 22—Increased inventories of balloon and high pressure tubes and casings are shown in the report for October of the Rubber Association of America, Inc. Pneumatic casings and solid and cushion tire inventories showed reductions.

Comparative figures for October and September are as follows:

	Inventory	Production	Shipments
Balloon Casings			
Oct.	3,070,060	1,755,646	1,668,051
Sept.	2,949,531	1,968,229	2,090,799
High Pressure Casings			
Oct.	3,750,731	1,916,053	1,560,399
Sept.	3,419,030	2,143,498	2,182,732
Balloon Tubes			
Oct.	4,358,084	1,786,536	1,649,595
Sept.	4,318,512	1,956,234	2,128,619
High Pressure Tubes			
Oct.	7,588,923	2,869,433	2,456,252
Sept.	7,165,399	3,736,578	3,692,619

Akron Executives Discuss Conditions With Dealers

AKRON, Dec. 18—Executives of leading tire companies and directors of the National Tire Dealers Association met this week to discuss conditions in the tire industry and to consider means of correcting influences which have caused friction between manufacturers and retailers in the past. As result of the meeting it was stated better relations had been established and a stronger spirit of cooperation would be effected.

Plans were made for educational work among dealers generally, one of the important steps being intended to convey to dealers a more complete knowledge of their costs of doing business.

A. B. P. Officers Change

NEW YORK, Dec. 22—Jesse H. Neal has resigned as executive secretary of the Associated Business Papers effective Jan. 1. With Mrs. Neal he will leave on a six months' Mediterranean trip. To take the place which Mr. Neal filled for 11 years, the executive committee of the A. B. P. has created the office of managing director to which Frederick M. Feiker has been appointed. After Jan. 1 headquarters of the A. B. P. will be at 52 Vanderbilt Ave., this city.

Windsor Plan Approved

DETROIT, Dec. 23—Executives at factories here have been advised that the Windsor used car plan has been approved and may soon be put into operation by dealer associations at Fort Wayne, Ind., Akron, St. Paul and Kalamazoo.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Dec. 23.—Business is largely under the influence of seasonal conditions. Retail trade is large, and current reports indicate that the volume of holiday business in many sections will reach a record total. Industry, on the other hand, is operating under reduced schedules, many plants being closed entirely for inventory taking. Commodity prices declined last week, while the general movement of stock quotations was toward higher levels. Money rates were practically unchanged.

FOREIGN TRADE

The preliminary foreign trade report for November shows exports of $481,000,000 and imports of $376,000,000, as against exports of $456,000,000 and imports of $378,000,000 in October and exports of $448,000,000 and imports of $376,000,000 in November a year ago. The export balance of $105,000,000 compares with a similar balance of $71,000,000 in November, 1925.

FREIGHT CAR LOADINGS

Freight car loadings during the week ended Dec. 4 numbered 1,058,151, which compares with 942,792 in the preceding week (a holiday week) and 1,026,839 in the corresponding period last year.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Dec. 15 were 11.7 per cent above the total for the preceding week but 1 per cent below that of a year ago.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 147.2 last week, the lowest figure reached so far this year. The wholesale price index of the Bureau of Labor Statistics declined from 149.7 in October to 148.1 in November.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve Banks increased $105,400,000 during the week ended Dec. 15, declines of $42,400,000 in discounts and $6,900,000 in open market purchases being more than offset by a gain of $154,700,000 in holdings of Government securities. Note circulation increased $36,300,000, deposits $103,900,000 and reserves $2,600,000, while the reserve ratio declined from 72.1 to 69.7 per cent.

During the same period, loans of reporting member banks increased $38,000,000, with gains of $74,000,000 in loans secured by stocks and bonds and $4,000,000 in loans secured by government obligations partially offset by a decline of $40,000,000 in "all other" loans. Investments rose $22,000,000 and net demand deposits $290,000,000, while borrowings from the Federal Reserve Banks declined $45,000,000.

F. A. Miller Named Gill Vice-President

Will Direct Sales and Advertising in Reorganized Merchandising Program

CHICAGO, Dec. 20—In connection with plans for an aggressive merchandising campaign, Gill Mfg. Co. has appointed F. A. Miller vice-president and director of sales and advertising, to take effect Jan. 1. The company, after a year of progress, as shown by the latest financial statement, is in position to carry through its expansion plan, which includes new sales helps for wholesalers and retailers, more comprehensive representation, and possibly the marketing of products in addition to the present line.

Mr. Miller comes to Gill from the Chilton Class Journal Co., for which, after work in various merchandising capacities, he organized two years ago the direct mail division and through this connection he has coordinated the sales and advertising plans of a number of manufacturers with judicious direct mail campaigns. He also supervised compilation of the Chilton Retail and Wholesale Trade List of more than 105,000 names.

His first connection with the industry was with Stromberg Motor Devices, 15 years ago, as advertising manager. Later he was a manufacturer representative, selling to car and truck builders.

The Gill company, in the last two years, has paid up bank loans amounting to $210,000. There is no outstanding fixed indebtedness or bank loans, and current liabilities are $6000 against which there are net quick assets of $450,000, including $34,000 cash, or a 75 to 1 ratio.

Goodyear Names Kitcher Australian Plant Head

AKRON, Dec. 18—Officials of Goodyear Tire & Rubber Co. are reported to be preparing an expansion program in the foreign field which may involve expenditure of more than $10,000,000. The first project is a tire plant in Sydney, Australia, plans for which were announced this week by President P. W. Litchfield. This will have a capacity of 1000 tires and 1000 tubes daily and will be in operation by December, 1927.

The Australian plant will be the fourth Goodyear has established outside of Akron. The others are the Bowmanville and New Toronto plants in Canada, and Goodyear of California, at Los Angeles.

The new plant will be headed by W. G. Kitcher, vice-president; William Urquhart, factory manager, and Robert C. Metzler, secretary-treasurer.

Goodyear is the first of the large American tire companies to establish an Australian plant.

AYRES SEES SALES OFF 6% IN 1927

CLEVELAND, Dec. 18—Col. Leonard P. Ayres, vice-president of the Cleveland Trust Co. and nationally known economist and statistician, predicts that general business during 1927 will be slower than in the year just ending. Discussing the automotive industry Colonel Ayres said:

"It seems not unlikely that the production of automobiles may be about 5 or 6 per cent less than it has been in 1926 and there seems little prospect that important financial troubles will develop as a result of the widespread practices of instalment selling. However, 1927 will be a good business year even if at slightly lower levels than 1926."

Chrysler to Increase Canadian Operations

WINDSOR, Dec. 20—Decision of the Chrysler Corporation of Canada, Ltd., to acquire the former plant of the Fisher Body Corp., at Ford, Ont., will result in the corporation trebling its manufacturing space in Canada, according to John D. Mansfield, who predicts further increases in business for 1927. Besides bodies—axles, transmissions, wheels and many other parts will also be made here.

Production in the Chrysler Canadian plant enjoyed an increase of approximately 100 per cent during 1926 and, according to Mr. Mansfield, he is of the opinion that the company will experience a similar increase in business during 1927. "The poor weather in the fall hurt crops somewhat, but nevertheless the country is prosperous, and farmers throughout the West seem to have plenty of money. Loan companies are complaining that loans are being repaid too rapidly."

Davis to Show New Car

RICHMOND, IND., Dec. 20—George W. Davis Motor Car Co. will exhibit its Silver Anniversary model at the New York show. This car, which is also called model 94, is made in three body styles—sedan, coupe and roadster. The units include Continental engine, Delco ignition, Warner transmission, Borg & Beck clutch, Ross steering gear, Timken bearings, Lockheed 4-wheel brakes. Finish is duotone Duco with fenders in the same finish. List price is $1285.

Eaton Finds Sales Gain

CLEVELAND, Dec. 20—Eaton Axle & Spring Co. executives report a considerable pick-up in business. December opened decidedly better than November, although there has been no slump this fall. Next year's business is expected to start off with a decided improvement.

Democrats to Press for Tax Revision

Will Initiate Action in 30 Days Through Presentation of Petition

WASHINGTON, Dec. 18—By a vote of 11 to 9, a strictly party vote, the House Ways and Means Committee this week voted not to report any legislation for tax reduction at this session of Congress, and by this action tabled four bills, two of which had been introduced by Republicans, asking for complete elimination of the remaining 3 per cent excise tax set on automobiles.

The announcement was made by Representative W. R. Green, chairman of the committee, immediately after the meeting, who stated that the committee "unanimously agreed that no further revision of our tax system should be made until the effect of the last revision is known and Congress is in a position to estimate the normal revenue that may be expected from the revenue act of 1926."

This action, however, will not conclude the fight that Democrats will make to force tax reduction at the present session, Representative J. N. Garner, ranking Democratic member of the Ways and Means Committee, announced. Their next move, he declares, will be to circulate a petition in the House asking that the tax measure be taken from the hands of the Ways and Means Committee. This cannot be done for 30 days, under the rules, however, which gives the committee theoretically this much time to act.

If 218 members—a majority—of the House sign the petition, the fight can then be made on the floor, "with more than a fair chance to force the reduction," Mr. Garner declares.

Moto Meter Claim Upheld

NEW YORK, Dec. 20—The Moto Meter Co., Inc., has been granted an injunction by the English Chancery Court against Morris Motors, Ltd., which it claimed had been using an infringing instrument known as the "Wilmot Calometer." The injunction was granted following a decision upholding the British patents on the Boyce Moto Meter and it ordered the destruction or delivery of all infringing instruments. The decision is seen by the Moto Meter company as lending an international legal approval to the validity of Boyce Moto Meter patent claims.

James Foundry Sold

LA CROSSE, WIS., Dec. 17—The Iron Products Corp. has purchased the entire business, plant and equipment of the James Foundry Co., La Crosse, from the estate of Alfred James, who died several weeks ago. The operation will be continued, with additions of some lines.

Steel Mills Offer New Quantity Rates

Differentials Ranging 10 to 40 Cents Quoted Under Change in Order System

NEW YORK, Dec. 23—Cold-rolled strip producers in the Pittsburgh district have begun to quote new quantity differentials. One ton and less than three tons is the base price for quotations and buyers of from 3 to 10 tons may deduct from this 10 cents; 10 to 18 tons carry a differential of 15 cents; 18 to 50 tons, 25 cents; and 50 tons and over, 40 cents. Not all of the Pittsburgh cold-finishing mills have introduced the new system as yet, but it is thought that it will become general.

The present quotation is $3.50. The buyer of a 25-ton carload would get 25 cents reduction from the base price, provided his order is all of one size, one temper and is to be shipped in one lot, making the actual price to him $3.25. Heretofore, the tendency in the steel industry has been to make the base quotation apply to representative tonnages and, in times of brisk demand, to add a premium when small lots were bought.

Automotive demand for cold-rolled strip steel is not as broad as producers would like to see it but is fully in line with automotive buying of steel products in general. What business has been placed has been to provide material for the initial period of resumption of manufacturing operations in the new year. The bulk of January requirements remains to be covered.

In the sheet market it is now definitely recognized that the price advances promulgated in October have become obsolete. They were advances "on paper only" and consumers who until now have been drawing upon supplies contracted for previous to this advance are more than sanguine that they can duplicate their commitments at the same prices.

Pig Iron—Demand is light. Automotive foundries do not look upon prevailing prices as the last word in declines, following easier conditions in the coke and fuel markets generally. Some melters have picked up attractive lots of scrap and are taking their time about committing themselves more extensively.

Aluminum—Some resale lots of metal are reported to have been offered in the Detroit market. Importers are reported to be adhering to the domestic producer's quotation for 99 per cent pure metal and quoting 26 4/5 cents for 98 and 99 per cent pure.

Copper—The market is marking time at unchanged prices. Automotive copper and brass products at the lowest prices for the year, will speedily reflect the slightest upward turn in the copper market.

Tin—Speculators have the market to themselves, consumers hoping for lower prices before buying more freely.

Lead—Although the price of the metal is attractive more animated demand from storage battery consumers is in abeyance.

Zinc—Quiet as the market is a firmer tendency is apparent.

CITROEN TAKES OVER FACTORY IN GERMANY

PARIS, Dec. 8 (by mail)—The Andre Citroen Co. has acquired the Rheinewerk Poll factory, in the suburbs of Cologne and is now equipping it for the construction and assembly of its car for the German market. This factory covers an area of 678,000 sq. ft. and was used until a few months ago for body building. Citroen will import the main units of his car from the French factory and will assemble at Cologne. Deliveries will begin next February. The Budd company now has a factory operating in Germany which will supply Citroen with bodies.

Auto Body Receiver to Dissolve Company

LANSING, Dec. 20—The circuit court has entered an order dissolving the Auto Body Co., and the Central Trust Co., which has been acting as temporary receiver, has been named permanent receiver. The plant will be offered for sale. Debts of the company aggregate $800,000. To satisfy this there is $100,000 left in stock on hand and $200,000 more in liquid assets. If the receivers can sell the plant for $500,000, all claims would be met, but nothing would be left for the stockholders.

Once a money making concern and one of the most important of Lansing's industrial plants, it began to feel the strain of competition in 1921 when losses were $389,000. In 1922 losses were $293,000 and in 1923 a profit of $89,000 was recorded, without however, allowing for depreciation on property and equipment. In 1924 profits dropped to $29,000 and in 1925 dwindled to $18,000. It is said that a single order, this year, lost the company $100,000.

During its earlier years the company was sufficiently successful in the body field to pay dividends. During its career the company disbursed $218,000 in dividends besides 67,500 shares of stock in stock dividends. The last dividend was in 1917.

Gramm Offers Fast Model

LIMA, OHIO, Dec. 20—Gramm Motors, Inc., has announced the "Gramm Fast Freighter" in 3 and 4-ton capacities with 177 and 200-in. wheelbases. A six-cylinder, 3⅞ by 5-in. motor is used. Springs are chrome vanadium steel of the two-stage type, 46 by 3 in. front and 58 by 3½ in. rear. Brakes are fitted to the rear wheels and the propeller shaft. The rear axle is double reduction, full floating with ratios of 5.65 in the 3-ton model and 6.50 in the 4-ton. Wheels and tires are optional. The frame has no kick-up over the rear axle and is 29½ in. from the ground.

G.M. Retail Sales Gain in November

Drive by One Division Brings Increase, Says Sloan—Exceed Factory Shipments

NEW YORK, Dec. 23—Sales by dealers handling General Motors lines totaled 101,729 in November as against sales to dealers by car manufacturing divisions of 78,550. The November retail sales figure compares with 99,073 in October and with 60,257 in November, 1925. The sales by divisions compare with October sales of 115,849 and with November, 1925, sales of 73,374.

In a statement on the November business, A. P. Sloan, Jr., president, pointed out that the increase over October is not an indication that the trend of sales has increased to any material degree, but rather that it is due to an intensive retail drive inaugurated by one of the car divisions.

Retail sales in the four months to Nov. 30 totaled 441,331 against 308,695 in the same period in 1925. For the five months to Dec. 31, Mr. Sloan estimated sales will total 500,000 against 364,824 in the 1925 five months.

With regard to new car stocks in dealer hands, Mr. Sloan said:

"General Motors dealers have stocks of unsold cars considerably less than a month's sales at current rate of consumption, and stocks have not shown an increase proportionate to the large growth in the business of the corporation, notwithstanding that an entirely new line of cars, the Pontiac, was added this year and the several thousand new dealers taken on by our divisions required additional cars for display and demonstration purposes."

New Model Delay Lowers G.M. Exports in Quarter

NEW YORK, Dec. 20—Sales by General Motors dealers in export territories totaled 86,596 in the first nine months of 1926 as against 67,760 in the same period in 1925, an increase of about 28 per cent. Sales in the third quarter totaled 22,799 as against 31,861 in the second quarter and 25,906 in the third quarter last year. The decrease in the third quarter is ascribed by A. P. Sloan, Jr., president, to be due to delay in getting new models underway in the many new assembly plants established during the past year in various places throughout the world.

Continental Adds Models

DETROIT, Dec. 20—Continental Motors Corp. has added a series of two-cylinder engines for its industrial division to its line of fours and sixes. The new engines will be introduced at the National Road Show in Chicago, Jan. 10 to 14. In addition a number of industrial power units will be displayed. The company has added many new industrial customers during the past year.

Men of the Industry and What They Are Doing

Matheson Turns Talents to Refrigeration Field

C. W. Matheson, who retired recently as vice-president and general sales manager of the Oakland Motor Car Co., has been elected vice-president and director of sales for Kelvinator, Inc., manufacturer of refrigeration devices.

During the past two years Mr. Matheson served as head of Oakland's sales department, and before that was an assistant to Alfred P. Sloan, Jr., president of General Motors Corp. Previously he had been with Dodge Brothers, Inc., with whom he spent 10 years in various sales capacities, finally serving as general sales manager and vice-president in charge of sales.

Chrysler Promotes Jenkins

A. F. Jenkins has been appointed sales manager of the Chrysler Corp. of Canada, Ltd., and Charles E. Boutelle has been named assistant sales manager. Mr. Jenkins had been connected with the Flint and Dort organizations before joining Chrysler in Canada about two years ago. Mr. Boutelle first became associated with Chrysler as sales supervisor of the western Ontario territory and later had charge of sales extension activities at the factory as director of sales development.

Bakewell Joins Bunting

George M. Bakewell is the new head of the export department of the Bunting Brass & Bronze Co. Previously he was overseas representative of the Champion Spark Plug Co. Just before joining the Bunting company, Mr. Bakewell completed his third trip around the world, covering 178,000 miles and visiting every place where there is any form of commerce or industry. Mr. Bakewell will make his headquarters at the export offices of the company, 254 West Fifty-fourth St., New York.

Peerless Promotes Raab

R. A. Raab, assistant manager of the Cleveland branch of Peerless, has been appointed manager of the Peerless branch at Baltimore. Mr. Raab gained most of his experience in Cleveland with Oakland and Hupmobile and was manager of the Cleveland Hupmobile branch. He went with Peerless in 1923.

White Branch Heads Change

W. E. Aughtry has been made manager of the Wilmington, Del., branch of the White Co., succeeding Vaughn Smith, resigned. J. E. Hamlett, has been appointed branch manager at Reading, Pa., taking the post vacated by G. C. Young who resigned.

Splitdorf President Named

Walter Rautenstrauch has been elected president of the Splitdorf-Bethlehem Electrical Co.

W. R. Tracy

New Director of Sales of Oakland Motor Car Co.

Walton Leaves James Valve

Thomas R. Walton has resigned as secretary and treasurer of the James Motor Valve Co., Detroit, effective Jan. 1. Mr. Walton has been associated with the company since its formation six years ago and has played an active part in the development of its replacement and parts business. A statement of John H. James, president, announcing the resignation said the severance comes as result of a major change in parts policy. Mr. Walton will leave for a month's vacation trip and will announce his plans on his return.

Nash Promotes Auten

Announcement has been made of the promotion of James Auten to the position of general manager of the Milwaukee division of the Nash Motors Co., which is the production unit of the Nash special six. Mr. Auten joined the Nash organization on July 16, 1923, as works manager at Milwaukee, when that plant employed 1200 men and produced about 80 cars a day normally. At present the normal payroll is upwards of 2200 men and the capacity is 275 cars.

W. J. Lynch

CLEVELAND, Dec. 18—W. J. Lynch, superintendent of the Stearns factory for 15 years and later service manager for A. L. Englander, Hupmobile distributor, died here after a short illness of pneumonia. Mr. Lynch was one of the oldest automobile men in Cleveland and at the time of his death was with the Cleveland distributor organization of Mack Trucks, Inc.

D. E. Anderson Appointed Bohn Sales Engineer

D. E. Anderson has been appointed sales engineer of the Bohn Aluminum & Brass Corp., Charles B. Bohn, president, announces. Mr. Anderson's association with the industry dates back 22 years, nine of which were with the Cadillac Motor Car Co., where he recently has been specializing on engine development and at the same time handling all patent matters and serving on the new devices committee of General Motors Corp.

Mr. Anderson was largely responsible for the design of the Essex four and the Hudson racing cars and has been chief engineer of the Sunnyhome Electric Co. and of the Falls Motor Co.

In his new position Mr. Anderson will assist A. L. Nelson on the Nelson Bohnalite piston and will be similarly occupied in the promotion of other Bohn products.

Halbleib Nominated

Edward A. Halbleib, vice-president and general manager of the North East Electric Co. has been nominated for the presidency of the Rochester Chamber of Commerce. The annual election will be held this month.

Neville Heads Smith Wheel

Burns Lyman Smith has resigned as president of Smith Wheel, Inc., and has been elected chairman of the board. James C. Neville, formerly vice-president, has been elected president.

Rule Heads Michigan Copper

William M. Rule has been appointed general manager of the Michigan Copper & Brass Co., succeeding the late A. B. Seelig.

S. A. E. Hears MacCracken

CHICAGO, Dec. 18—Safer than any type of land or water transportation was the way aviation transport was described at a meeting this week of the Chicago Section of the Society of Automotive Engineers by W. P. MacCracken, assistant secretary of commerce. He expressed the opinion that the transportation of mail and express by air presented the immediate profitable opportunities and he compared the sending of mail at 10 cents per half ounce with the cost of carrying a passenger if the passenger were charged on the same basis. The need of better and more landing fields was stressed.

Wetmore Names Sales Agent

MILWAUKEE, Dec. 20—Wetmore Reamer Co. has appointed Rummins & Murray, Inc., as its Detroit representative dating from Jan. 1. Offices will be at 4829 Woodward Avenue.

British to Build Export Trade Car

Plan Study of Overseas Requirements—May Pool Foreign Representation

LONDON, Dec. 8 (*by mail*)—The Prime Ministers of Australia and New Zealand, D. T. Chadwick of the Indian delegation to the Imperial Conference, and J. P. J. Brunt, secretary to the office of the high commissioner for the Union of South Africa, met representatives of the British motor industry in London yesterday for a further discussion on the development of Empire trade in automobiles. At the close of the conference the manufacturers announced that they had decided to dispatch an expert delegation, at the earliest possible moment, to explore the whole position in Empire markets and to report to the industry at home as to any further steps which should be taken to meet oversea requirements.

The Australian Premier was very strongly of the opinion that special models (or a special model) for the Australian market were needed and would find a ready sale in other countries. He would like to see this policy undertaken cooperatively by British makers, but failing that he advocated that some of them should adopt it individually. He and the other overseas representatives urged the need for adequate stocks of spare parts being maintained in the large centres of population in foreign markets.

Impending cooperation between British makers was hinted at yesterday by Lieut. Col. A. Hacking, secretary of the Society of Motor Manufacturers. He predicted that the next 12 months would see some evolution in the British motor industry and said that it might arise in the process of amalgamation of competitive interests in this country or by the formation of an export pool to save duplication of factory representation. This might be a somewhat slow process, Colonel Hacking said, but meanwhile it might be that in the very near future some cooperative steps would be taken by manufacturers to secure a reduction in freights, to adopt some form of cooperative advertising, to pursue still further the policy of standardization and to come to an arrangement for joint service plants overseas.

Another British Maker Placed in Receivership

LONDON, Dec. 10 (*by mail*)—On the application of S. F. Edge, who is chairman of the company and a mortgage debenture holder, the High Court today appointed a receiver and manager of A. C. Cars, Ltd., to protect the interests of all debenture holders against the action of unsecured creditors. The latter had presented a petition for the winding-up of the company, which, it was said, had not enough cash in hand to pay this week's wages of £3,800.

S. F. Edge, the founder of the Napier business, though latterly unconnected with it, has devoted the greater part of his energies since 1921 to A. C. cars and has found the capital needed to carry on until now. He has popularized this make of high-grade light car to a notable extent. At the present time it is said to have a record number of orders in hand and contracts with dealers, while the turnover during the last 12 months was greater than in any previous year.

J. P. Morgan Buys Manville Interest

NEW YORK, Dec. 22—J. P. Morgan Co. has acquired an important stock interest in the Johns-Manville, Inc., it was announced here this week. All of the preferred stock which H. E. Manville, president, will receive as a result of the stock split-up in the present reorganization of Johns-Manville, Inc., has been purchased. Through the acquistion the Morgan firm has invested close to $7,500,000 in the business, it was reported.

Mr. Manville confirmed the report that he had sold his preferred stock to the Morgan company but declined to reveal the amount involved. He explained that the proposed financing does not involve any change in the management. Mr. Manville controls the company.

November Report Shows Payroll Drop

WASHINGTON, Dec. 22—The automobile and automobile tire industries, which, ordinarily, do not gain or lose employees to any appreciable extent in November, each reported a loss of more than 8 per cent last month, as compared with November, 1925, figures just compiled by the Department of Labor at Washington show.

Reductions of 1.2 per cent and 3.2 per cent, respectively, in employment in manufacturing industries and in their payroll totals for November, as compared with November a year ago, are shown.

The most pronounced decreases in employment were said to be seasonal, as, for instance, in the carriage and wagon industry where the drop was 20.7 per cent.

Would Standardize Tractors

WASHINGTON, Dec. 22—Standardization of types of farm tractors, as a means of meeting the competition of American-made machines, has been suggested to Italian manufacturers by the Minister of Economy, says a cable to the Department of Justice from Rome. Increased importation of American farm machinery has led to the suggestion that Italian manufacturers reduce their production to two or, at the most, three types, specially designed for Italian conditions.

Financial Notes

Black & Decker Mfg. Co. stockholders will meet Dec. 28 to vote on a proposal to increase authorized shares to 290,000 shares from 80,000. The 40,000 shares of $25 par preferred will remain unchanged, all being at present outstanding. Of the 250,000 shares of common to be issued, 100,000 shares of no-par value will be exchanged for 40,000 shares of the present common, par value of which is $25.

Johns-Manville, Inc., has called a special meeting of stockholders for Dec. 28 to vote on a plan to issue 100,000 shares of 7 per cent preferred and 750,000 shares of no par common. If this plan is approved by stockholders, it is proposed to exchange to present common stock on the basis of three-tenths of a share of 7 per cent preferred and three shares of new no par common for each present share of common.

India Tire & Rubber Co. has declared a dividend of 62½ cents on the common stock, payable Jan. 1, to stockholders of record Dec. 20, while a dividend of 1¾ per cent, the regular quarterly return, was ordered on preferred shares, payable on the same date.

Continental Motors Corp. has declared the regular dividend of 80 cents per share, payable Jan. 31 to stockholders of record Jan. 15. With this dividend the company will have paid to stockholders in 1926 $1,408,676.

Thompson Products, Inc. has declared a dividend of 3 per cent on common stock, payable Dec. 31 to stock of record Dec. 20, and quarterly dividends of 1¾ per cent on the preferred payable March 1 to stock of record Feb. 19.

Federal Motor Truck Co. has notified the New York Stock Exchange of cancellation of 200,000 shares of $10 par stock and authorization of 500,000 shares of no par capital stock, of which 410,000 have been issued.

Sparks-Withington Co. directors declared the regular quarterly dividends of 25 cents a share on the common and $1.75 on the preferred payable Dec. 31 to stock of record Dec. 20.

Dodge Brothers, Inc., declared regular dividend of $1.75 on the preferred, payable Jan. 15 to stock of record Dec. 27.

May Build New Car

BUFFALO, Dec. 18—Factory buildings and land acquired and held several years by the Parenti Motor Car Co., have been sold to the Brooks Locomotive Co., Ltd., Toronto.

It is reported the Brooks Locomotive Company paid $200,000 for the property, which consists of factories having 11,500 square feet of floor space and twelve acres of land. The Brooks company, it is reported, will manufacture a new automobile in the factory.

Ford Fixes 8% Payment

DETROIT, Dec. 22—Ford Motor Co. employees who are holders of Ford investment certificates will share in a return at the rate of 8 per cent for the six months ending Dec. 31.

Industry is Asked Oil Economy Views

Federal Board Seeks Opinions From Executives in Conservation Movement

WASHINGTON, Dec. 18—Questionnaires to leaders in the automotive industry, asking if they can suggest ways and means of conserving the nation's gasoline and oil supply, are being sent out this week by the Federal Oil Conservation Board, which is making a study of the possibilities of a substitute for gasoline; of a gasoline engine that will be more economical; whether or not a Diesel engine, burning distillates, can be adapted to automobiles, and if the electrical industry cannot perfect an electric motor which will contribute to the solution of a growing gasoline shortage.

A letter accompanying the questionnaire, being sent to automobile manufacturers, engineers and others, says in part: "The board is now engaged in seeking improvements in engine design that call for less demand for motor fuel. This phase of our report will include also, consideration of high-compression engines, Diesel engines for automotive equipment, possibilities of the use of electric motor vehicles, the need for a lightweight storage battery and the possibility of using gas producers on automobiles.

"The board would appreciate very much your views on the above subjects. Very likely you will be able to suggest other similarly important topics and if so you may be assured that your opinion will be valued."

Letters of similar tenor, accompanying questionnaires, are being sent to leaders in the electric light manufacturing industry asking their views.

Meetings and Events Scheduled for Week of New York National Show

FRIDAY, JAN. 7

Studebaker Corp. of America, Dealer Banquet, Hotel Plaza ..... 7.00 P. M.

MONDAY, JAN. 10

Automotive Electric Association, Board of Governors' Meeting, Astor.
National Automobile Chamber of Commerce, Third World Motor Transport Congress, Roosevelt.
National Automobile Dealers Association, Convention, Commodore ..... 10.00 A. M.
Rubber Association of America, Meeting and Banquet, Commodore.
Society of Automotive Engineers, Metropolitan Section Meeting, Commodore.
John N. Willys, Luncheon to News and Trade Paper Men, Biltmore ..... 12.30 P. M.

TUESDAY, JAN. 11

American Automobile Association, Contest Board Meeting, Roosevelt ..... 10.00 A. M.
Automotive Electric Association, Advertising Committee Meeting, Astor..... 10.00 A. M.
Geo. W. Davis Motor Car Co., Distributors' Dinner, Commodore ..... 7.00 P.M.
National Automobile Chamber of Commerce: Third World Motor Transport Congress, Roosevelt. Service Meeting. Banquet.
National Automobile Dealers Association, Convention, Commodore ..... 5.00 P. M.
National Automobile Dealers Association, Joint Service and Shop Equipment Meeting, with M. & A. M. A. and N. A. C. C. ..... 10.00 A. M.
Oakland Motor Car Co., Luncheon, Commodore ..... Noon
Packard Motor Car Co., All-Day Sessions for Distributors and Dealers, Biltmore

WEDNESDAY, JAN. 12

American Automobile Association, Board of Directors' Sessions, Roosevelt .... Morning and Afternoon
Auburn Automobile Co., Luncheon, Commodore ..... Noon
Cadillac Motor Car Co., Banquet, Biltmore ..... 7.30 P. M.
Chevrolet Motor Co., Meeting, Mecca Temple ..... Afternoon
Banquet, Commodore ..... Evening
Chrysler Sales Corp., Dealer Luncheon, Commodore ... 1.00 P. M.
Elcar Motor Co., Dealer Meeting and Lunch, Astor..... Noon
H. H. Franklin Mfg. Co., Luncheon and Meeting, Commodore ..... 1.00 P. M.
Motor and Accessory Manufacturers Association, Directors' Meeting ..... Morning
Meeting and Election of Officers, Astor ..... 2.00 P. M.
Dinner.
Nash Motors Co., Luncheon, Pennsylvania Hotel ..... Noon
National Association of Automobile Show & Association Managers, Meeting.
Olds Motor Works, Meeting, Commodore ..... 2.00 P. M.
Eastern Dealers' Dinner, Commodore ..... Evening
Packard Motor Car Co., All-Day Sessions for Distributors and Dealers, Biltmore.
Willys-Overland, Inc., Luncheon, Roosevelt ..... 12.30 P. M.

THURSDAY, JAN. 13

American Automobile Association, Board of Directors' Session, Roosevelt..... Morning
Overseas Automotive Club, Dinner and Meeting, Hotel Empire ..... 6.30 P. M.
Paige-Detroit Motor Car Co., Luncheon, Commodore.
Peerless Motor Car Corp., Dinner, Commodore ..... 6.30 P. M.
Society of Automotive Engineers, Dinner, Astor.
Velie Motors Corp., Luncheon, Commodore ..... 1.00 P. M.

N.A.D.A. to Help Stage Show Service Meetings

ST. LOUIS, Dec. 20—In furtherance of plants for promoting the shop equipment departments of the national shows, the National Automobile Dealers Association will hold joint service and shop equipment meetings Jan. 11 in New York, and Feb. 3 in Chicago, in cooperation with the Motor and Accessory Manufacturers Association and the National Automobile Chamber of Commerce. These will be features of the New York show week meeting and the Chicago annual meeting at which well-known figures in the industry and in the sales field will be speakers.

The programs for the service and shop equipment meetings are being arranged by H. R. Cobleigh, secretary of the service committee of the N. A. C. C.; Neal G. Adair, manager of the show and educational departments of the M. & A. M. A., and C. A. Vane, general manager of the National Automobile Dealers Association.

The annual meeting will be held in Chicago on Jan. 31, with convention sessions Feb. 1 and 2. Among the speakers at the Chicago sessions will be Alfred Reeves, general manager of the National Automobile Chamber of Commerce; A. R. Glancy, president of Oakland Motor Car Co., and J. H. Collins, vice-president Chilton Class Journal Co.

G.M. Truck Opens Branch

MILWAUKEE, Dec. 17—Milwaukee's importance as a center of motor truck distribution has been enhanced by the action of the General Motors Truck Corp. in elevating the sub-branch at Milwaukee to the rank of a full, direct factory branch. It will continue, for the present, to occupy the same quarters, but provision for much larger space will soon be made. T. C. Phillips, formerly with the White and the Mack truck organizations, has been appointed branch manager.

Cogan Expands Factory

CLEVELAND, Dec. 20—Cogan Machine & Foundry Co., Inc., has erected a new factory building which will give larger and better facilities for the manufacture of its special machines for the automotive industry.

Peerless Shares Payment of Employee Insurance

CLEVELAND, Dec. 20—Group insurance for employees aggregating $2,000,000 life insurance and $10,000 in weekly benefit health and accident protection, has been taken out by the Peerless Motor Car Corp. in the Aetna Life Insurance Co. of Hartford. Under the blanket policy each employee gets $2000 life insurance without medical examination. Employees totally and permanently disabled before reaching 60 years of age, receive $2000 and employees will receive $10 a week for sickness and non-occupational accidents. The cost of the insurance is borne jointly by company and employees. It is to be effective when 75 per cent of the employees have applied.

Marmon Dealers to Meet

INDIANAPOLIS, Dec. 20—Distributors and dealers of the Marmon Motor Car Co., will hold their annual convention in Indianapolis, Jan. 3-4. Between 700 and 800 representatives of the company are expected to attend. The program will include demonstrations of all types of Marmon cars, including the series 75 and the new Little Marmon.

Higher Truck Rates in 1927 Insurance

Liability and Damage Coverance to be Increased 7.6 and 8.4 Per Cent

NEW YORK, Dec. 20—New rates for public liability and property damage insurance, which are to be formally announced next month, will be somewhat higher on the average for motor trucks and delivery wagons but substantially the same for passenger cars, it was announced today at headquarters of the National Bureau of Casualty & Surety Underwriters.

The new rates are based on a study of automobile accident insurance covering the years 1922 to 1925, inclusive. The rates on trucks and delivery wagons will average an increase of 7.6 per cent for personal injury coverage, and 8.4 per cent for property damage. It was explained that these are averages only and in some instances increases will be very much higher, while there will be corresponding decreases elsewhere.

An idea of the amount of money involved on this general basis may be gained from the fact that the average truck covered for public liability costs about $50 a year, the policy providing for damages up to $5000 per person and not in excess of $10,000 for any one accident. The same protection for passenger automobiles costs about $28. These are designated as standard limits.

Unlike fire and theft insurance, where the monetary extent of the damage is fixed and cannot exceed the value of the car, liability and damage insurance is based on flat rates of so much per car. The average cost of property damage covered for a truck is about $30, and about $12 for a passenger car. This provides a maximum protection of $1000 for any one accident.

According to H. P. Stellwagen, secretary-treasurer of the national bureau, approximately 18 per cent of the cars of the country are covered for public liability and 16 per cent for private damage.

The new rates will be proportionately increased in the case of buses, taxicabs, delivery cars and all other public passenger-carrying motor vehicles by about 20 per cent.

Rates to be promulgated by the National Automobile Underwriters Conference, which group specializes on fire and theft insurance, will not be announced until late in January or early in February.

G.M. Truck Locates Branch

BIRMINGHAM, ALA., Dec. 20—General Motors Truck Co. has opened a direct factory branch here under direction of C. E. Anderson. Mr. Anderson has been identified with truck sales for several years serving with Republic and Ruggles in eastern and southern territories.

CERTIFICATES SELL 40,000 CHEVROLETS

DETROIT, Dec. 20—The Chevrolet Motor Co. reports that more than 40,000 motor car buyers have taken advantage of the 6 Per Cent Purchase Certificate Plan since it was started in 1924.

According to a study conducted by the company it was found that the average motorist drives his car three years and pays for it the first year. It was also found that during the entire time the car is being operated the purchaser usually makes no provision for buying his next car. To overcome this condition Chevrolet worked out its plan.

Taxicab Companies Fight Insurance Law

BOSTON, Dec. 18—After almost nine months of lethargy the opponents of compulsory automobile insurance in the Bay State are beginning to train their guns on the new law. With only a few days before the statute becomes operative, taxicab interests have started what looks to be a finish fight against the high rates they would be compelled to pay. Under the law these rates are mandatory on the insurance companies.

Taxicabs in Boston in 1927 will be forced to pay for insurance 1¾ cents for every mile they operate. In other sections of the state the rates will be 1½ and 1¼ cents per mile. This means that about $500 would be assessed against every cab in the Boston insurance district in 1927 on the basis of a yearly operation of 30,000 miles each.

The taxicab companies believe the compulsory insurance law good, but they believe, too, that they have been discriminated against.

N.A.C.C. Exhibit Wins

NEW YORK, Dec. 20—The National Automobile Chamber of Commerce has been awarded first prize for its statistical exhibit at the convention of the American Trade Association Executives. This work of the N.A.C.C. is in charge of Oscar P. Pearson. The points of determination in the award were, scope of the field covered, statistical soundness of the procedure employed, and form of presentation.

1926 Rubber Estimate Cut

NEW YORK, Dec. 20—The estimated world requirements of rubber for the year 1926 have been reduced from 657,000 tons to 625,000 tons, according to advices to the Bankers Trust Co. of New York from its British information service. The estimated requirements of the United States have been reduced from 420,000 tons to 390,000, while those of Great Britain are expected to total 40,000 tons instead of 35,000 tons.

McKay Report Says Long Hauls Unsound

Finds Volume of Tonnage Carried Over Distances Losing Importance

WASHINGTON, Dec. 22—On the basis of an analysis of motor truck transportation in several states, Dr. J. G. McKay, chief of the Bureau of Highway Economics of the Bureau of Public Roads, has concluded, according to a summary of his analysis just issued here, that long-haul transportation by motor trucks is economically unsound. The principal function of the motor truck, according to Dr. McKay's analysis, seems to be "its development in the short-haul zone, as part of a correlated system of rail, water and highway transportation."

"The last 15 years have seen the reemergence of highway transportation, one of the oldest methods for the movement of people and goods," Dr. McKay says in the report of his analysis. "Mass movements of people and commodities on the principal routes of the various state highway systems confront us as a fact and not a theory.

"The general field of motor vehicle transportation can be divided into three major classes of service. First is local distribution of commodities and local transportation of people. This service constitutes in tonnage the bulk of the motor truck movement and is primarily the distribution of goods within cities and their suburban areas.

"In Connecticut, 67.1 per cent; in Ohio, 64.2 per cent and in Pennsylvania 77.3 per cent of the net tonnage transported by motor truck is hauled less than 30 miles.

Supplements Existing Lines

"The second principal use of motor vehicle service supplements existing rail and water service by extension of freight and passenger service into areas not served by rail or water lines: substitutes motor vehicle service for rail operation on unprofitable branch lines; and provides a combined service in conjunction with railroad or boat lines.

"The third class of motor vehicle service, the so-called long-haul transportation, is not important as to quantity of movement nor would it appear to be economically sound. For motor trucks, at least, the volume of tonnage in the long-haul zone is comparatively small and decreasing in importance.

"Probably the next few years will see the organization of large motor vehicle operating companies functioning as a part of existing rail and water systems or as independent operating companies." Dr. McKay urges "intelligent organization, improvement and control of this new type of transportation," and "intelligent planning of highway system to serve this rapidly growing method."

Stutz Shows Large Distribution Gain

INDIANAPOLIS, Dec. 18—A graphic presentation of the progress made by the Stutz Motor Car Co. of America, Inc., in the past year was made by F. E. Moskovics, president, at the sales and service convention held here this week. Mr. Moskovics said that a year ago the company had 35 distributors and 27 dealers. Today it has 136 distributors and 302 dealers covering many points in foreign countries besides the United States. In the year the company has exported 382 cars.

At the convention the dealers were shown the Series AA models, which will be announced to the public at the New York show.

Charles M. Schwab, one of the large stockholders in the Stutz company, made two addresses at the convention in one of which he reaffirmed his interest in the company and pledged it his continued personal and financial support. Speaking to the dealers Mr. Schwab emphasized the importance of service.

A feature of the convention was a series of demonstrations of the new cars on the Indianapolis speedway. At the banquet Monday evening the speakers were Dr. Walter Dill Scott, president of Northwestern University, and Mr. Schwab.

The various convention sessions included addresses by C. S. Crawford, chief engineer; E. S. Gorrell, vice-president; Bert Dingley, service manager; C. Alfred Campbell, sales development manager; Eugene McGuckin, head of the company's advertising agency; H. A. Dougherty, Kansas City distributor; Col. Warwick Wright, London distributor, and F. A. Seidler.

Changes New York Address

NEW YORK, Dec. 21—The New York office of the National Gauge & Equipment Co., now a division of the Moto Meter Co., Inc., has been moved to 15 Wilbur Ave., Long Island City.

Coming Feature Issues of Chilton Class Journal Publications

Jan. 1—Automobile Trade Journal—Annual Show Issue.

Jan. 6—Motor Age—Annual Show Issue.

Jan. 20—Commercial Car Journal—New York Show Issue.

Jan. 27—Motor Age—Chicago Show Issue.

Feb. 19—Automotive Industries—9th Annual Statistical Issue.

Acme Truck to Continue Acme and United Lines

CADILLAC, MICH., Dec. 20—Under plans of Acme Motor Truck Co. following purchase of United Motor Products Co., both Acme and United lines will be manufactured in the Acme plant here and the dealer organizations now existing will be kept separate so far as possible. G. R. Wilber has joined Acme to direct sales of the United line, and sales of Acme will continue under L. C. Klesner.

In purchasing the United company, Acme took over all inventory, drawings, manufacturing equipment, etc., and the right to use the name United and to build United trucks.

Lansing Durant Plant Down

LANSING, Dec. 20—The assembly lines in the local Durant plant have been shut down and operations will not be resumed until after the first of the year. During this time inventory will be taken and the plant overhauled in preparation for next year's business.

Yellow Adds 6-Cylinder Cab

CHICAGO, Dec. 20—Yellow Truck & Coach Mfg. Co. has introduced a new six-cylinder taxicab selling at $1795 fully equipped.

Maintenance Talks Attract Big Meeting

NEW YORK, Dec. 17—The Metropolitan Section of the Society of Automotive Engineers hung out the "S. R. O." sign at its December meeting this week. The topic under discussion was automotive maintenance and the Automotive Service Association of New York, the Motor Truck Association of America and the Motor Truck Maintenance Club cooperated in staging the meeting. T. L. Preble of the White Co., and John Stillwell of the Consolidated Gas Co., were the speakers, and J. F. Winchester, Standard Oil Co. of New Jersey; T. C. Smith, American Telephone & Telegraph Co.; Ralph Benham, Studebaker Corp. of America; Nat Mallouf, Mallouf Haulage Co.; B. K. Rhoads, International Harvester Co., and Ralph Werner were prominent in the discussion.

Moon Driveaways Increase

ST. LOUIS, Dec. 21—Moon Motor Car Co. is erecting a large addition to its final test department to permit of an increased production volume in the coming year. With the new facilities the company will be able to handle a much larger volume of driveaway deliveries which it finds increasing because of improved roads in the Middle West.

Gardner Adopts Fedco

ST. LOUIS, Dec. 20—Gardner Motor Co., Inc., has adopted the Fedco system as standard equipment on the new 80 and 90 models. A loss-of-use insurance policy is also provided under which the Gardner owner is paid $5 a day up to 30 days, for every day he is deprived use of the car through theft.

White Down for Inventory

CLEVELAND, Dec. 23—The White Co. shut down the major portion of its production departments today and will reopen them Jan. 3. During the suspension inventory will be taken.

Calendar of Coming Events

SHOWS

Cairo .....Feb. 15-March 15
First International Motor Show.

Chicago .....Jan. 10-15
Coliseum, American Road Builders' Association.

Chicago .....Jan. 29-Feb. 5
National, Coliseum, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.

Chicago .....Jan. 29-Feb. 5
Annual Salon, Hotel Drake.

Colombo .....Jan. 6-16
All-Ceylon Motor and General Engineering Exhibition.

Copenhagen .....February
Danish Automobile Exposition.

Geneva .....March 4-13
Palais des Expositions.

Los Angeles .....Feb. 12-19
Annual Salon, Hotel Biltmore.

New York .....Jan. 8-15
National, Grand Central Palace, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.

CONVENTIONS

American Road Builders' Association, Congress Hotel, Chicago ....Jan. 10-15

Automotive Electric Association, Electrical Service Meeting, Congress Hotel, Chicago .....Feb. 1-2

Motor & Accessory Manufacturers Association, Dinner, New York, Jan. 12

National Association of Automobile Show and Association Managers, New York .....Jan. 12

National Association of Automobile Show and Association Managers, Drake Hotel, Chicago .....Feb. 3

National Automobile Dealers Association, Hotel Commodore, New York .....Jan. 10-11

National Automobile Dealers Association, La Salle Hotel, Chicago..Feb. 1-3

National Safety Council, Mid-West Safety Congress, Hotel La Salle, Chicago .....Feb. 21

Rubber Association of America, meeting and dinner, Hotel Commodore, New York .....Jan. 10

N. A. C. C.

Chicago, Feb. 1—Service Meeting.
New York, Jan. 10-11—Third World Motor Transport Congress.
New York, Jan. 11—Service Meeting.
New York, Jan. 11—Banquet.

S. A. E.

Detroit, Jan. 25-28—Annual Meeting.
Detroit, Jan. 28—Carnival.
New York, Jan. 13—Banquet.

RACES

Altoona, Pa. .....June 11
Atlantic City .....April 30
Charlotte, N. C. .....May 9
Fresno, Cal. .....April 21
Indianapolis .....May 30
Los Angeles .....Feb. 22
Los Angeles .....April 10
Salem, N. H. .....June 25